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Preview: Global Air Navigation Industry Symposium

Defining the Future of Air Traffic Management

Industry weighs in on the investment and planning impacts of new Aviation System Block Upgrades in advance of the 2012 ICAO Air Navigation Conference

Also in this issue:

FRMS 2011 Preview: Symposium and Forum

New Task Force on Safety Information Protection

Outcomes: Global Runway Safety Symposium

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Editorial
ICAO Communications Office
Tel: +01 (514) 954-8220
Web site: www.icao.int

Anthony Philbin Communications
Senior Editor: Anthony Philbin
Tel: +01 (514) 886-7746
E-mail: info@philbin.ca
Web site: www.philbin.ca

Production and Design
Bang Marketing
Stéphanie Kennan
Tel: +01 (514) 849-2264
E-mail: info@bang-marketing.com
Web site: www.bang-marketing.com

Advertising
FCM Communications Inc.
Yves Allard
Tel: +01 (450) 677-3535
Fax: +01 (450) 677-4445
E-mail: fcmcommunications@videotron.ca

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Tel: +01 (514) 954-8022
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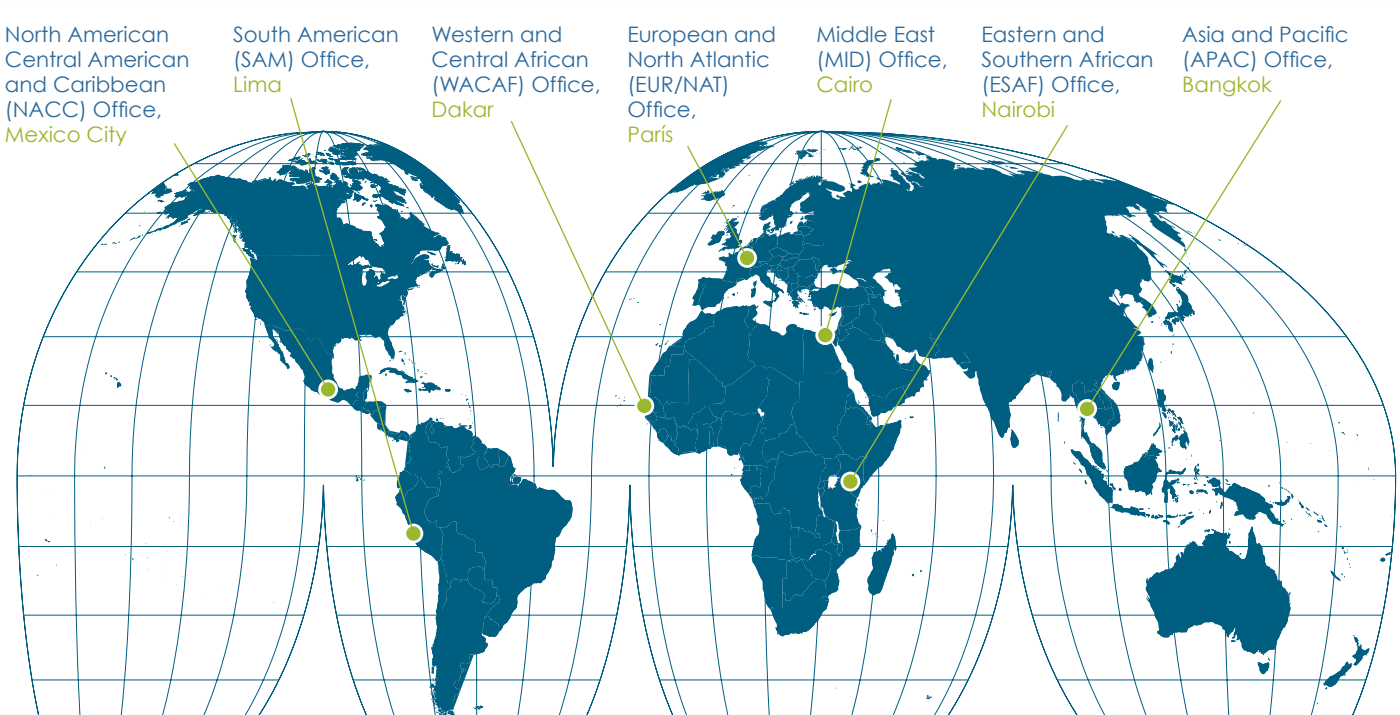
ICAO's Global Presence



GANIS: Giving Industry a Critical Voice

The ICAO Global Air Navigation Industry Symposium (GANIS), taking place this September, is a key event where States and Industry can gain insight into ICAO's approach in developing the future aviation system. It is a platform for them to provide feedback regarding this approach and allows industry representatives to have a critical voice in the deliberations leading up to the Twelfth Air Navigation Conference at the end of 2012.

The year 2010 was the safest on record. Air traffic is growing, however, so we need to increase our efforts in order to continue improving aviation's already impressive safety record. New technologies can serve to decrease the number of accidents if they are introduced in a globally harmonized and consistent manner.

We know that over US$ 120 billion is expected to be spent on new technology and systems over the next 10 ten years, on a worldwide basis. Investments of this magnitude need to be coordinated to ensure that they meet all requirements and expectations. Simply put: the aviation system needs to evolve. And harmonization of the aviation system worldwide is necessary for this evolution to occur; this is where ICAO comes in.

Technical and operational challenges associated with this evolution are relatively easy to tackle but the political and economic challenges that we face are much more difficult. This is why ICAO created the Future Aviation Challenge Team: a group composed of aviation's most senior leaders and decision makers. The members of this team have a unique opportunity, and responsibility, to work together and bring a globally interoperable aviation system into reality.

Air Traffic Management (ATM) modernization programmes, such as NextGen in the United States, SESAR in Europe and CARATS in Japan, have all been developing technological and operational solutions to accommodate the traffic growth expected in the near future.

ICAO's role, in conjunction with the wide-ranging experts and stakeholders involved in the Challenge Team, is to establish a programmatic framework for States that have advanced efforts to come together and develop what we call "Aviation System Global Block Upgrades".

An Aviation System Block Upgrade is a set of improvements that can be implemented globally from a defined point in time to enhance the performance of the ATM System. Each "Block" is made up of modules and each module represents a specific, well bounded improvement. The agenda of the GANIS is based on these Block Upgrades. During the Symposium, participants will have the opportunity to learn about each Block Upgrade, listen to what subject matter experts from different areas of our Industry have to say about them, and provide their feedback to ICAO.

In addition, there may be some Regional Symposiums that will provide further input on the Block Upgrades as well. ICAO plans to present the Aviation System Block Upgrades to States at the Twelfth Air Navigation Conference, in November 2012.

Call to Action

The demand that will be placed on our industry due to the forecasted traffic growth in coming decades means that decision makers in States and the aviation community must address the urgent need to develop and implement the future aviation system.

The public sees air travel as the safest mode of transportation. This trust, that airlines will safely take passengers to their destination and that the public and private sectors' leaders will sustain and improve the mobility of people and goods, underlies almost all our modern economic activity. Loosing this trust is not an option.

The world's financial markets appear today to be more vulnerable to significantly increasing levels of risk. Decision makers must prioritize their investments by focusing on laying the groundwork to ensure States' social and economic prosperity. Aviation is not only a significant economic sector in and of itself, directly employing tens of millions globally across the travel and tourism sectors alone, it is also instrumental in moving 2.5 billion people and 50 million tonnes of cargo annually, enabling the generation of some $1.5 trillion of global GDP[1].

Aviation is at a crossroads. We must invest correctly today to ensure that we maintain a safe and efficient aviation system tomorrow. ■

[1] Oxford Economics, *Aviation: The Real World Wide Web*, 2009.

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Aviation at a Crossroads

2011 Global Air Navigation Industry Symposium to preview significant and dramatic changes in store for global ATM over the coming decades

Since its earliest beginnings, the nature of air transport has helped humanity develop practical and cooperative solutions that have transcended borders and bridged cultures. These technological, financial and legal frameworks have helped to bring people together over the past seven decades in ways that could never before be imagined, fostering social and economic development and a culture of instant and convenient global mobility which many of us today take very much for granted.

As we enter our second decade of the 21st century, global societies are now wrestling with the hard realities of a world population that has grown by 40 percent in just the last 20 years and which will grow by another 2 billion people by the year 2050. In the context of the dramatic changes this growth has in store for all of us, ICAO and the aviation community have spearheaded a new strategy to keep aviation safe and convenient for travellers in the decades ahead while simultaneously meeting or surpassing responsible and effective environmental targets.

In 2012, ICAO will convene a landmark Air Navigation Conference that will seek broad agreement on aviation's new strategic plan. In advance of this event, the Organization is hosting a special Global Air Navigation Industry Symposium this September which will serve to frame some of the key topics and solutions that will be presented in 2012, ensuring that technological capabilities and stakeholder strategies are coordinated to the fullest extent possible.

ICAO estimates that $120 billion will be spent on the transformation of air transportation systems in the next ten years. While NextGen and SESAR in the United States and Europe account for a large share of this spending, parallel initiatives are underway in many other areas, including Latin America, Russia and Japan.

Modernization is an enormously complex task but one which the industry absolutely requires. It is clear that to safely and efficiently accommodate projected increases in air traffic demand—as well as respond to the diversified needs of operators, the environment and other inherent issues—it is necessary to evolve ATM systems in order to provide the greatest operational and performance benefits.

The 37th ICAO General Assembly (2010) directed the Organization to double its efforts towards satisfying global needs for airspace interoperability while sustaining our sector's focus on the constant improvement of aviation safety outcomes.

On the basis of this mandate, ICAO initiated the Aviation System Block Upgrades (ASBU) initiative to outline the required framework and develop a set of tailored and programmatic Air Traffic Management (ATM) solutions.

These were first introduced to a special high-level Future Aviation Challenge Team convened earlier this year by ICAO's Air Navigation Bureau and will be presented to the broader aviation community at the forthcoming Global Air Navigation Industry Symposium (GANIS) to be held at ICAO Headquarters in September 2011.

"The take-home message for GANIS industry participants will be centred on the individual modules that will constitute each of the Block Upgrades that have been established," noted ICAO Chief, Future Aviation Systems and Technology, Richard Macfarlane. "The technological requirements defined by each of the modules are where the big expense items are—for industry in particular. This is what will impact their investment and planning strategies most significantly."

"The take-home message for GANIS industry participants will be centred on the individual modules that will constitute each of the Block Upgrades that have been established. The technological requirements defined by each of the modules are where the big expense items are—for industry in particular. This is what will impact their investment and planning strategies most significantly."

For States, operators and Air Navigation Service Providers (ANSPs), interest at GANIS will be focused on the incremental advances and scheduling flexibility mechanisms associated with the various aircraft and infrastructure upgrades they will be responsible to implement.

"The advantage of the Block Upgrade approach for these stakeholders will also be certainty of investment," stressed Macfarlane. "If you're an operator, for instance, you need to have absolute certainty surrounding what type of avionics kit you need on board all those new aircraft you're purchasing to upgrade your fleet. Every aspect of the new system becomes interrelated at one point or another and that's why using ICAO's leadership to bring everyone under one roof and define these strategies now is so important."

The finalized ASBU transition plan will take full advantage of current technologies and foresees the implementation of latest capabilities in practical and targeted stages to fulfill the long-envisaged objective of a globally-interoperable ATM system. In as much as the coming decades will be defined by high levels of traffic growth and the capability of aviation to respond to them in a unified, strategic manner, the stakes have never been higher with respect to ensuring that air transport remains the key enabler of economic development and global mobility that the world has learned to expect from it.

"Traffic is traffic," emphasized ICAO Air Navigation Bureau Director, Nancy Graham. "When people experience too much of it on their roads they expect wider roads. When they experience it in air travel they expect those of us with the knowledge and capabilities at our disposal to do something about it. The dangers and delays of over-congestion aren't acceptable to travellers and they aren't acceptable to ICAO. This is why we're taking a lead role to help coordinate the latest technologies and strategies into a practical global plan of action for our States and for the sector as a whole."

"Even in a global financial and credit environment characterized by increasing uncertainty, the fact that aviation serves as an essential infrastructure component for so much modern economic activity means that it must be supported."

Aviation Modernization: An Essential Component to Global Economic Recovery

As the world economy grows, so air traffic and airspace congestion grow. This expansion inflicts increasing pressure on aviation infrastructure and facilities already stretched to the limit in many parts of the world. Inevitably, delays and safety incidents will multiply while access and predictability will suffer unless urgent and carefully coordinated actions are taken.

"Even in a global financial and credit environment characterized by increasing uncertainty," noted Graham, "the fact that aviation serves as an essential infrastructure component for so much modern economic activity means that it must be supported. In order for States to provide themselves with the tools and capabilities they require to bring their societies back to reasonable levels of prosperity and financial security, air navigation systems and infrastructure must be modernized to facilitate rather than impede the recovery of the countless industries and sectors which it serves."

ICAO's solution to this urgent challenge is the ASBU initiative. It represents the most, consultative, practical and strategic global approach for facilitating interoperability, harmonization, and modernization of air transportation worldwide, providing States and regions with the support they will need to return the global economy back to more secure levels of stability.

What is an Aviation System Block Upgrade?

An ASBU designates a set of improvements that can be implemented globally from a defined point in time to enhance the performance of the ATM System. The concept of employing ASBUs originates from existing near-term ATM implementation plans and the realities associated with limited access to advanced technological improvements in many regions of the developing world.

It is clearly acknowledged that various airspaces will only require certain ASBU modules to be implemented at specified times.

ASBUs are based largely on the operational concepts extracted from ongoing research outcomes and other developments associated with the United States' Next Generation Air Transportation System (NextGen), Europe's Single European Sky ATM Research (SESAR) and Japan's Civil Aviation Reform of Air Traffic Services (CARATS) programmes.

The ASBU strategy is also closely aligned with the ICAO *Global Air Traffic Management Operational Concept* as outlined in Doc 9854.

The intent of the ASBU approach is to apply the key capabilities and performance improvements, drawn from these strategic programmes and plans, across additional regional and local operational environments. In every case this will be enabled such that the same level of ATM performance and associated benefits will be accessible on a more global scale.

Each ASBU is comprised of a suite of modules characterized by:

- A clearly-defined measurable operational improvement and success metric.

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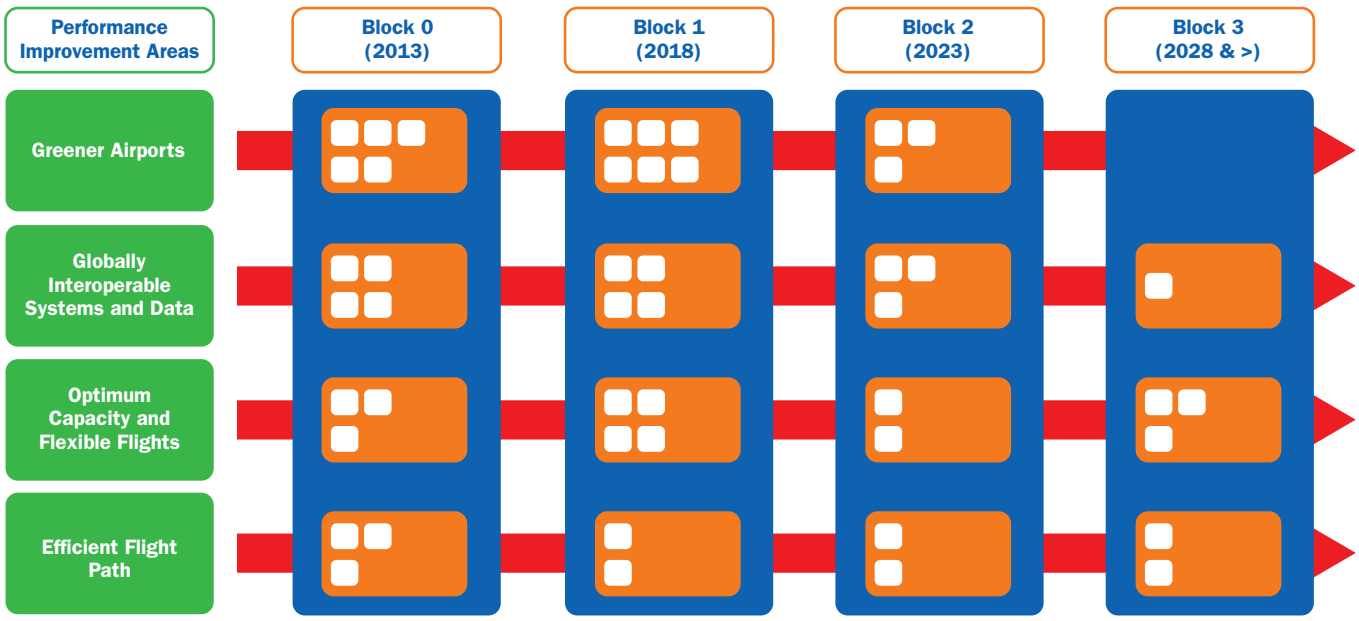
Figure 1: Summary of Block Upgrades Mapped to Performance Improvement Areas



- Necessary equipment and/or systems in aircraft and on ground along with an operational approval or certification plan.
- Standards and procedures for both airborne and ground systems.
- A positive business case over a clearly-defined period of time.

An ASBU module can contain several elements made up of communications, navigation, surveillance components in the airplane, a communication system, a ground component of the ATC automation or decision support tool for controllers, etc. The elements mutually make the module comprehensive and cohesive.

A series of dependent modules across the block upgrades represent a coherent transition thread in time from basic to more advanced capability and associated performance. The date considered for allocating a module to a block is that of the Initial Operating Capability (IOC).

For each module, a common description structure has been used which includes the following:

- Link to the Global ATM Operational Concept and the GANP's Global Plan Initiatives (GPIs).
- Timescale.
- Intended performance operational improvement/metric to determine success.
- Domain (e.g. en-route, TMA, etc.).
- Applicability (e.g. local, larger geographical scale, network).
- Minimum level of fleet equipage to get benefits, etc.
- Narrative description.
- Necessary procedures (air and ground).
- Necessary technology (air and ground).
- Business case (specific to the block).
- Regulatory/standardization needs and approval plan (air and ground).
- Implementation and demonstration activities.
- Main dependencies and risks.

The timeline reflected in Figure 1 (above) refers to the availability or ability to use the module in an operational manner and generate operational benefits. There are several activities (research, development, validation) which need to be properly planned and executed before reaching the IOC dates and these are an integral part of the plan (e.g. the necessary infrastructure to support a block upgrade capability).

The inclusion of a module in a block is also dependent on the time at which the appropriate ICAO provisions will be made available and the operational capability deployable. For instance in the case of 'Block 0', no new airborne technologies are required.

ASBUs describe a way to apply the concepts defined in the ICAO *Global Air Navigation Plan* (GANP—Doc 9750), facilitating the synchronization between air and ground systems, as well as between regions. Their implementation is being organized into five-year time increments starting in 2013 and proceeding through 2028 and beyond.

This type of structured approach provides a basis for sound investment strategies and commitment from equipment manufacturers, States and operators/service providers. The development of block upgrades will change the focus from top-down

Promoting improved cooperation to enhance regional safety oversight

Symposium on Regional Safety Oversight Organizations

ICAO HQ, Montréal 26–28 October 2011

In line with Assembly Resolution A37-8, the 2011 ICAO Symposium on Regional Safety Oversight Organizations (RSOOs) will bring together all parties that have a stake in the establishment and management of RSOOs, including ICAO COSCAPs.

Key Themes:

- Regional cooperation for the enhancement of safety oversight.
- Establishing and sustaining an RSOO.
- Challenges facing RSOOs over the 2011–2013 triennium.
- Other factors strengthening the functions of RSOOs.

For more information please contact:

Ms. Leonor Solari
Tel: +1 514 954-8219, ext. 6013
Fax: +1 514 954-6759
Email: isd-saf@icao.int

ASBU TECHNICAL TEAM

The specific elements of the proposed ICAO block upgrades are defined by a special Technical Team, comprised of subject matter experts from the following public- and private-sector bodies and organizations:

- ICAO
- Joint Planning and Development Office/Federal Aviation Administration (JPDO/FAA)
- SESAR Joint Undertaking (SJU)
- EUROCONTROL
- International Air Transport Association (IATA)
- European Aviation Safety Agency (EASA)
- International Federation of Air Line Pilots' Associations (IFALPA)
- International Federation of Air Traffic Controllers' Associations (IFATCA)
- Civil Air Navigation Services Organisation (CANSO)
- Airports Council International (ACI)
- International Business Aviation Council (IBAC)
- International Council of Aircraft Owner and Pilot Association (IAOPA)
- Radio Technical Commission for Aeronautics (RTCA)
- European Organisation for Civil Aviation Equipment (EUROCAE).
- International Coordinating Council of Aerospace Industries Associations (ICCAIA)
- NextGen Institute

planning to more bottom-up and pragmatic implementation actions in the regions.

Heightened Collaboration and ASBU Success

Two specialized teams involved in air transportation modernization will define and govern the work of the ASBU initiative.

The *Technical Team,* comprised of subject matter experts, develops the ASBU modules that support key performance improvement areas—defined in terms of time and evolving technologies *(see sidebar, above).* The *Challenge Team,* comprised of government and industry senior executives, provides senior level policy guidance and oversight.

Stakeholders such as service providers, regulators, airspace users and manufacturers will be facing increased levels of interaction under the ASBU approach as new, modernized ATM operations are implemented. The highly integrated nature of capabilities covered by the Block Upgrades requires a significant level of coordination and very high levels of cooperation are therefore essential for achieving the global harmonization and interoperability that ICAO has established as a sector-wide goal.

For ICAO and its governing bodies, ASBUs will likewise require the development and delivery of necessary Standards and Recommended Practices (SARPs) to States and industry in a prompt and timely manner to facilitate regulation and ensure operational benefits worldwide. This process will be enabled by using the Standards roundtable and various technological roadmaps.

States, operators and industry will therefore benefit from the availability of SARPs with realistic lead times, allowing for the development of adequate action plans for evolving existing infrastructure or, if needed, investment in new facilities and systems.

Risks, Challenges and Next Steps

All programmes face risks and require appropriate mitigation strategies. The most significant risk in global airspace modernization is related to timing and the mix of technical, political, and infrastructure requirements. The ASBUs are expected to mitigate the risks anticipated in establishing a globally harmonized airspace.

As an airspace becomes tailored to a State's unique needs and a business case that supports viable operational benefits, there are a set of risks that exist independent of the specific solution(s) chosen. These include:

- Non-homogeneous deployment across the regions.
- Lack of synchronization of air and ground deployments.
- Future investment in the existing ATM programmes by key stakeholders not secured.
- Delays in standards development and approvals.
- AIM not implemented in a globally interoperable way.
- SWIM not implemented in its correct form.

The deployment of Block Upgrades has been chosen to resolve many of these risks. The timing and sizing of these are in response to the need for mature standards, integrated air and ground solutions, and the establishment of positive business cases that bring identifiable benefits forward for a level of equipage and infrastructure cost. Those capabilities that lack specific maturity in content or described benefit are purposefully placed in the later Block Upgrades.

ASBUs also respond well to the issue of non-homogeneous deployment across regions. Each block and its underlying components are intended to interoperate seamlessly independent of how they are implemented in neighbouring States. This ensures that procedures, training, policies and other 'infrastructure' elements are consistent, enabling a safe transition to a more capable airspace.

Global Air Navigation Industry Symposium

ICAO HQ, Montréal 20–23 September 2011

The 2011 GANIS Symposium will provide a unique platform for global and regional industry partners to share latest developments and ensure the furture interoperability and harmonization of 21st century air navigation systems.

Particpants will be provided with an opportunity to discuss emerging issues and to chart out the next steps to achieve a seamless global air navigation system. GANIS will focus particularly on new Aviation System Block Upgrade proposals and supporting technology modules in advance of the 2012 Twelfth Air Navigation Conference.

Key Topics:

- Aviation System Block Upgrades
- Air/Ground and Ground/Ground Communications
- Enroute and Terminal Navigation Systems
- Aerodrome Surveillance
- Industry perspectives on ICAO CNS/AIM and Avionics Roadmaps

"ASBUs will only play their intended role if sound and consistent technology roadmaps are developed and validated. At the same time, all stakeholders involved in worldwide ATM modernization should be prepared to align their activities and planning based on the ASBU strategy."

ASBUs were defined to minimize their specific risks but it is not possible to foresee all potential issues associated with timing and adoption. In that regard these upgrades bring the following risks:

- States may not be capable of ensuring successful deployment of Block 0.
- If Block 0 is not implemented as a foundation, certain functionalities may not be available as enablers for future blocks.
- Identification and resolution of policies necessary to enable the future blocks.
- Delays in availability of new technologies to support implementation of Blocks 1, 2 and 3.
- Delays in the availability of required SARPs.
- National regulatory frameworks may be unable to support implementation of Blocks 1, 2 and 3.

Having established a structured roadmap, however, aviation stakeholders now benefit from a framework for discussion and resolution of open issues associated with the specific risks attributed to the ASBU approach. The mapping provided by the Block Upgrades gives ICAO and industrial standards makers a tool to unify and synchronize their actions. This is expected to limit the scope and complexity of the challenge towards achieving global airspace modernization.

For the standards makers (ICAO, RTCA, EUROCAE, SAE), this provides a basis to coordinate efforts, avoid duplication and deliver global and interoperable unified standards. Various actors of industrial standardization should combine their efforts to support the activities of ICAO towards delivering the proper framework so that industry can develop and implement the relevant technology.

The Twelfth Air Navigation Conference is currently projected to deliver a proper level of agreement on the GANP and associated roadmaps. This includes establishing work programmes and working methods and to achieve timely availability of adequate materials.

Equipped with a global mapping of the ASBUs and various roadmaps which will constitute the revamped GANP, it will be possible to develop or update respective Regional Air Navigation Plans, taking into account the necessity of maintaining interoperability and having a clear picture of the various components of the desired operational benefits.

Conclusion

The ASBU initiative should constitute the framework for a worldwide agenda towards ATM system modernization. Offering a structure in line with expected operational benefits, it should support investment and implementation processes by making the relationships between needed technologies and operational improvements more clearly understood.

ASBUs will only play their intended role if sound and consistent technology roadmaps are developed and validated. At the same time, all stakeholders involved in worldwide ATM modernization should be prepared to align their activities and planning based on the ASBU strategy.

The challenge of the 2012 Twelfth Air Navigation Conference will be to establish a solid and worldwide endorsement of the ASBUs as well as incorporation of the related technology roadmaps into the revised Global Air Navigation Plan under the concept of One Sky. This year's GANIS event is an important step towards achieving those 2012 outcomes. ■

GRSS 2011

Outcomes and Actions Promise Sector-wide Improvements for Runway Safety

ICAO and its industry partners came together at the Organization's and the sector's first-ever Global Runway Safety Symposium (GRSS) this past May, agreeing on a range of measures to reduce runway-related accidents. Four hundred and twenty participants from 73 ICAO Member States and international aviation organizations attended the GRSS event, which was held at the Organization's Headquarters in Montreal.

Outcomes of the GRSS discussions included joint recognition of the need to develop guidance to initiate specialized Runway Safety Teams. Additionally, participants reinforced the need to harmonize runway safety definitions, taxonomies and the reporting of runway conditions and other safety indicators. The need to standardize and improve communication procedures in and around runways was also highlighted.

"We now have a clearer understanding of the roles and responsibilities of each of the partners as we continue to address, reduce and work towards eliminating runway incursions and excursions," commented ICAO Air Navigation Bureau Director, Nancy Graham. "The multidisciplinary approach we undertook at GRSS 2011 is the only option for coming to grips with the complex set of operational and human factors issues associated with this safety domain."

Runway operations continue to represent the most significant single source of aviation accidents and fatalities. Over the past five years, about one third of all aviation accidents reported to ICAO were linked to runway operations. Eighteen percent of these were the result of runway 'incursions' or 'excursions'. Runway incursions involve the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft. Excursions occur when aircraft veer off or overrun the runway surface.

"While 2010 was the safest year ever in the history of civil aviation, the consistent growth in air traffic over the coming decades means that we have to act now to develop and implement proven technological and operational solutions that will make sure we improve upon our remarkable safety record," Graham added.

The GRSS results mean that ICAO and its partners will now be increasing the scope and frequency of their runway safety data sharing. Partners will also be helping ICAO to promote and encourage the implementation of new runway safety solutions, committing to working with the Organization and its Member States to fund and deliver 12 Regional Runway Safety Seminars that will be held across every continent over the next three years *(see sidebar, page 18).*

The Regional Runway Safety Seminars will result in the development of action plans to promote the establishment of collaborative runway safety teams

PRIMARY OUTCOMES OF THE 2011 ICAO GLOBAL RUNWAY SAFETY SYMPOSIUM

One size does not fit all:

- Solutions need to account for local conditions yet be standardized and harmonized to ensure interoperability.
- Runway incursions and excursions are the main issues but other aspects such as Bird Strike, FOD present additional runway safety risks.

Collaborating at multiple levels:

- International organizations have committed to work together to compile and promote proven solutions and endorse best practices.
- Runway Safety Teams will be established locally and hosted by the airports.

Improve standardization and harmonization:

- Develop guidance to define and launch Runway Safety Teams.
- Harmonize “Runway Safety” definitions, taxonomies and reporting of runway conditions and other safety indicators.
- Standardize and improve communication procedures.
- ICAO to ensure that Standards and Guidance material are fit for purpose.
- Implementation of ICAO Standards monitored through the Continuous Monitoring Approach.

Promote and encourage implementation of solutions, such as:

- Training & collaboration.
- Runway & taxiway markings & signage.
- Runway End Safety Areas (RESAs).
- PBN approach implementation.
- Arresting Systems.
- EFBs, on-board awareness and alerting systems.
- All partners have committed to increasing the exchange of runway safety information.

ICAO dedicated runway safety page:

- Library of downloadable toolkits and documents.
- Contributions from partner organizations.
- Links to Skybrary and other runway safety partner sites.

Regional Runway Safety Seminars (RRSS):

- All Runway Safety Programme Partners have committed to support delivery of Regional Runway Safety Seminars.
- RRSS events will result in action plans to create runway safety teams and provide support to those already in place.
- Progress will be monitored with updates provided to all partners through RASGs and other appropriate means.
- Reduction of risks will be monitored on a regular basis, with follow-up actions taken as required.
- Communication and outreach plans are being established.

Participants to the 2011 Global Runway Safety Symposium. The event’s results mean that ICAO and its partners will now be increasing the scope and frequency of their runway safety data sharing, among the additional outcomes noted above.

involving airlines, airports and air navigation service providers.

Other commitments included agreement to further develop best practices and improve the sharing of these among ICAO Member States and industry. Work will also be started towards the development of common definitions, metrics and analysis methods which will facilitate the reporting of hazards encountered in the runway operational environment as well as related information sharing initiatives necessary to support a multidisciplinary runway safety programme.

ICAO and partner organizations will also begin to develop more multidisciplinary guidance material and training workshops for relevant personnel in flight operations, air traffic management and airport operational areas.

The close cooperation between aviation's major stakeholders that will be driving all of these actions has already led to a number of solutions, including the Runway Excursion Risk Reduction Toolkit (RERR Toolkit). The second edition of this toolkit, a joint collaboration with IATA and with contributions from ACI, CANSO, IFALPA and other industry partners, was released at the GRSS event. It provides information, training modules, presentations, videos and best practices in an interactive format.

"I'm very impressed with the progress that has been made on the runway safety portfolio and with the level of multidisciplinary collaboration that has led to these achievements," commented IATA's new Director General, Tony Tyler. Tyler replaced Giovanni Bisignani as of July 2011.

"IATA's carriers take this issue very seriously and we have been working very hard with all concerned stakeholders to enhance the new edition of the RERR Toolkit," Tyler noted. "We've all brought a wide range of data and input to bear on this problem and IATA is very happy to see how quickly industry and regulators are making use of the latest information to both provide and implement practical solutions."

ACI World Director General Angela Gittens, who announced a new global safety programme at GRSS 2011 called Airport Excellence in Safety (APEX), also stressed the importance of all runway safety programmes working closely together to coordinate successful results.

"To drive down the number and severity of runway safety incidents, all those involved in safety at the airport must work together to meet that objective – including airports, airlines, pilots, air traffic controllers and the many people on the ground who contribute to delivering safe travel," Gittens stressed. "This close collaboration is critical in

"The multidisciplinary approach we undertook at GRSS 2011 is the only option for coming to grips with the complex set of operational and human factors issues associated with this safety domain."

Nancy Graham
Director, ICAO Air Navigation Bureau

order to reduce the potential for accidents and improve airport response in case of an incident."

ACI's APEX programme components build on ICAO principles of airport certification in line with Annex 14 and Safety Management Systems (SMS), as well as information transparency. To learn from experience, an APEX database for incident information sharing will be based on a non-punitive, 'just culture' environment.

"ACI will also be facilitating a 'Safety Partners' network to further promote mutual assistance," Gittens commented. "We recognize that not all regions, nor even all airports in the same region, may be facing the same hurdles. To this end we'll be working in close collaboration with our ACI regional offices and our local aviation partners on tailoring the common framework with flexibility for meeting specific and identified local needs. ACI airports are also looking forward to assuming central coordination roles with respect to on-site stakeholder safety teams, demonstrating not simply a willingness to collaborate but also to take on a management and leadership role in facilitating joint runway safety efforts at the airport."

CANSO Director General Graham Lake highlighted his organization's efforts to promote a better understanding of the role ANSPs play in preventing runway excursions and incursions at GRSS 2011. He drew attention to the recently published CANSO educational booklet: *Unstable Approaches - ATC Considerations,* which was developed by the organization's Safety Standing Committee.

"We have to work together, we have to improve together and we have to share data," Lake remarked during his GRSS address. "CANSO also places a great deal of emphasis on the need to establish a just, non-punitive reporting culture and also the development of improved and agreed methods and terminology to better harmonize the reporting process and make it more effective. All stakeholders have to recognize that they have a role in contributing to the improvement of runway safety and CANSO is very pleased to be playing its part." ■

UPCOMING REGIONAL RUNWAY SAFETY SEMINARS

Proposed Date	Location	State Co-host	International Organization Co-host
* 2011: 24 – 25 October	Miami	FAA	IFATCA
* 2011: 13 – 14 December	Delhi	CAA, India	IATA/FSF
* 2012: 08 March	Amsterdam	Eurocontrol	ATC Global/CANSO
2012: April/May	Middle East		CANSO
2012: July	South America		CANSO
2012: August	Asia Pacific		AAPA/IATA
* 2012: October/November	Cape Town		CANSO
2013: March	Western Africa		ACI
2013: June	Europe	Eurocontrol	
2013: August	Asia Pacific		AAPA/IATA
2013: September	Europe	Eurocontrol	IATA
2013: November	Asia Pacific		FSF

**Confirmed*

Formalizing New Approaches to Fatigue Risk Management Systems

Following closely on new Fatigue Risk Management Systems (FRMS) Standards and Recommended Practices (SARPs) approved by the ICAO Council this past June, ICAO will be convening its first ever FRMS Symposium in late August of this year. Immediately after the Symposium, ICAO will host the Third Annual Meeting of the FRMS Forum in early September.

Together, these FRMS events will provide a unique 4-day opportunity where participants and experts will be able to share experiences and develop a deeper understanding of the sometimes complex concepts that support FRMS risk-based approaches and their practical application for operators and flight crewmembers.

The timing of the ICAO 2011 Fatigue Risk Management Systems (FRMS) Symposium and Forum capitalizes on the significant collaborative momentum that the Organization has helped to nurture around this important safety issue.

ICAO has worked closely with IATA and IFALPA and additional experts and stakeholders in past months to ensure that the new FRMS guidance recently approved by the ICAO Council provides realistic solutions based on comprehensive operator and crewmember feedback.

"Current flight and duty time regulations are a 'one size fits all' solution," stressed Nancy Graham, Director of ICAO's Air Navigation Bureau. "In contrast, FRMS recognize the growing complexity of crew fatigue and offer multi-layered, comprehensive approaches to fatigue-related hazards in varying operational contexts. We look forward to widespread acceptance of the concept and its systematic application around the world."

Crew fatigue is often cited as a factor in aircraft accidents. To better address applicable safety risks, the ICAO Council officially adopted the new international Standards recommended for FRMS as of June 2011. These will become applicable as of 15 December of this year.

The new guidance has been developed through a comprehensive and collaborative process and will serve as an alternative to current prescriptive flight and duty limitations. Two of the key stakeholders consulted throughout the build-up to the new FRMS guidance have been operator and flight crewmember organizations.

"As an operator, Delta is very interested in hearing first-hand from stakeholders such as the FAA now that ICAO is bringing this issue to the international level," commented Delta Air Lines Captain, Jim Mangie. "It's one thing to discuss these issues with State regulators at the local level but when we start talking international standards it's crucial from the operator standpoint that we end up with a truly level playing field."

Mangie stressed that Delta has been engaged with the consultative process that has led up to the coming FRMS event through his role as a technical advisor to IATA. He noted that ICAO has

"Current flight and duty time regulations are a 'one size fits all' solution. In contrast, FRMS recognize the growing complexity of crew fatigue and offer multi-layered, comprehensive approaches to fatigue-related hazards in varying operational contexts."

done an excellent job coordinating the experts and air transport stakeholders who needed to provide the at times very complex input that the FRMS issues require.

"With respect to the FRMS Forum, for instance, we've never really had the opportunity to have the full range of bio-mathematical modelling input presented to us within the context of a single event. I and many of my colleagues are looking forward to what these presenters and the follow-on discussions will be bringing to the table under an international spotlight."

Captain Jim Mangie, Delta Air Lines

Operators already using FRMS have reported benefitting from greater operational flexibility while maintaining and even improving on current safety levels. The new Standards will facilitate the development and globally-harmonized implementation of the systems while making it easier for regulators to assess and monitor their use.

Operators represent one key stakeholder in the FRMS process but perhaps the most important input and buy-in to the FRMS approach needs to come from flight crewmembers themselves. This point was highlighted strongly by International Federation of Air Line Pilots' Associations (IFALPA) President, Captain Don Wykoff.

"As we move forward, one of the most important considerations for crewmembers is involvement," began Wykoff. "With FRMS, which by definition are a non-prescriptive approach to pilot fatigue, it's very important that flight crewmembers be included as stakeholders and fully accept their roles and responsibilities with respect to the reporting and data they need to input over the long-term. Their confidence in FRMS ultimately derives from the extent of their participation in the total process."

Wykoff went on to note that pilots will need to be assured that the data they'll be required to input under the FRMS approach is used for non-punitive FRMS benefits and not for other purposes. This basic trust is an essential component not only of a successful FRMS programme but of all non-prescriptive Safety Management Systems (SMS).

Guenther Matschnigg, IATA's Senior Vice President, Safety, Operations and Infrastructure (left), ICAO Air Navigation Bureau Director, Nancy Graham (centre) and Don Wykoff, President of IFALPA (right) at their joint announcement of the release of the new Fatigue Risk Management Systems (FRMS) Implementation Guide for commercial aircraft operators.

"These types of safety advances require change and there's always a certain level of resistance to change, but this is true not only for crewmembers but for operators and regulators as well," emphasized Wykoff. "Safety isn't an on-and-off switch. It's a complex collaborative process and any time we make an advance like FRMS we just need to respect the process and take a methodical, building block approach rather than doing everything at once. ICAO, IATA and IFALPA have structured the FRMS process to engineer the level of bottom-up buy-ins from the various stakeholders and in the end participation is the name of the game when seeking consensus on any safety improvement.

Captain Don Wykoff, IFALPA President

IFALPA is very much looking forward to further participation through ICAO's Symposium and Forum in September and to seeing what has been agreed at the international level now finding its way down to local pilot groups, operators and State regulators. These events should help to move that process along."

The new FRMS Standards are supported by extensive guidance material based on the input of an FRMS Task Force comprised of State regulators, operators, scientists and industry representatives. This includes an FRMS implementation guide for operators, jointly produced by ICAO, IATA and IFALPA. ICAO has also developed an FRMS guide for regulators, an unedited version of which has been posted on the ICAO web site along with the operators guide.

"The fact that regulators, airlines and pilots all contributed to this effort ensures that the appropriate technical, operational and economic issues have been thoroughly covered," ICAO ANB Director Nancy Graham commented. "The input of internationally-recognized scientists further ensures that the FRMS approach has a solid scientific and mathematical basis—an important consideration when developing risk-based guidance."

The new fatigue management standards allow States to choose whether to establish FRMS regulations. The provision of prescriptive flight and duty time limitations regulations remain mandatory for all States.

One regulator which was an active member of the ICAO FRMS Task Force and which has been closely involved with a number of FRMS advances and programmes over the past eight years is the UK CAA. This is thanks, in part, to its very close and productive collaboration in associated research with UK operator easyJet.

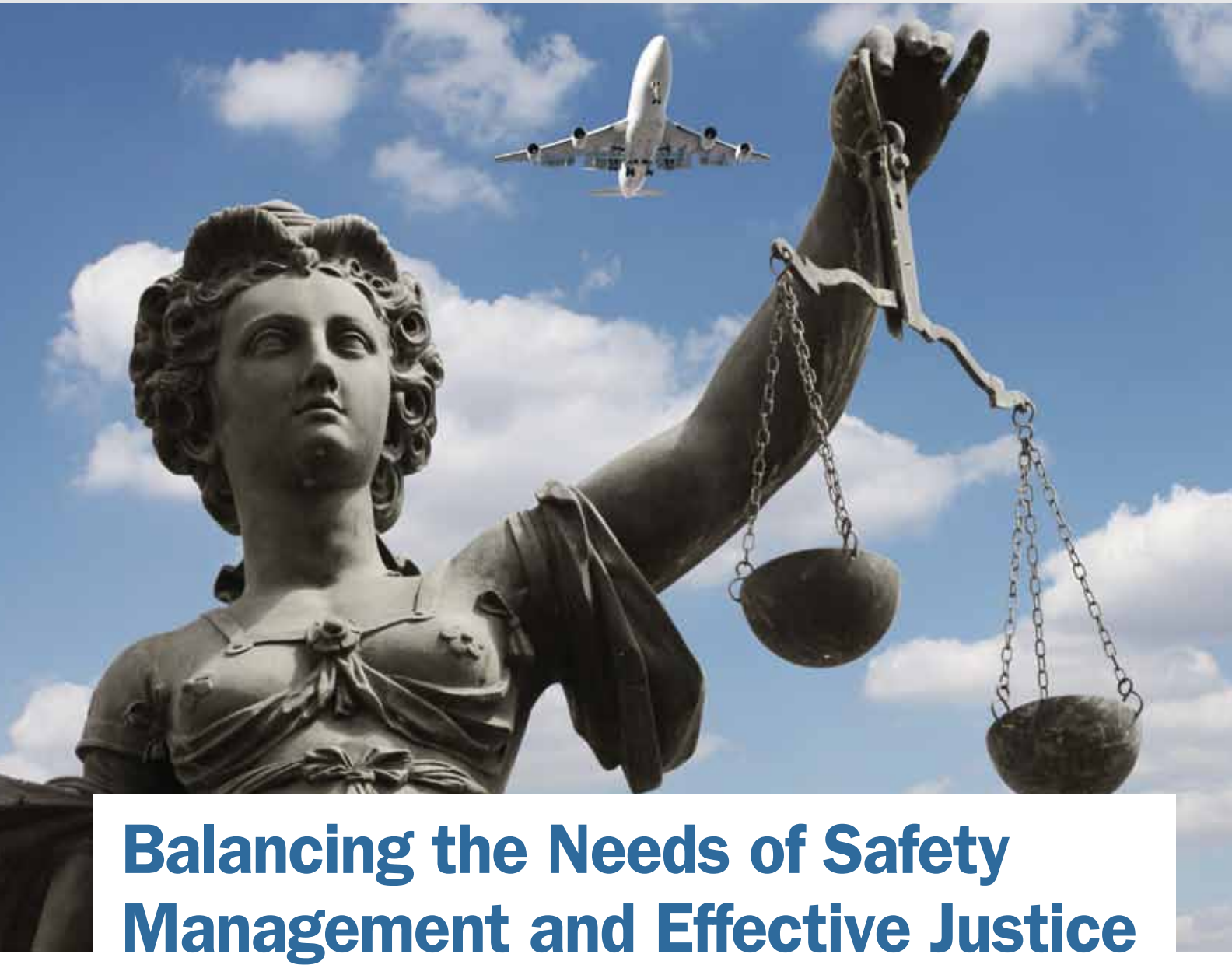
"As a State regulator, it can't be over-emphasized how important it is to be able to get a clearer picture of where other States are with respect to their level of understanding and implementation for new initiatives," commented Flight Times Limitations Specialist for the UK CAA, Kathryn Jones. "This is very much the case at this stage in the development of practical FRMS approaches. It's great to get everyone together at ICAO, as we will be this fall, as everyone gets to come away with a much better perspective on the progress being made by both the Task Force and by the sector as a whole."

"Operators and regulators already have access to 80 percent of the information that they need in order to design an effective FRMS—it's just a question of how they collate and categorize their data. It is a change in approach and requirements but the degree of change we're talking about is not an insurmountable leap by any means."

Kathryn Jones, UK CAA

Jones stressed that education will be high on the UK's list of FRMS priorities in the near-term. She's additionally looking forward to the coming ICAO events not only to improve her own understanding of where the global picture now stands, but also to help stress to the assembled stakeholders that FRMS is not an overly complex approach to managing crew fatigue and that it fits very much into the overall SMS culture and methodology.

"Getting that point across will be key to effective adoption," she remarked. "Operators and regulators already have access to 80 percent of the information that they need in order to design an effective FRMS—it's just a question of how they collate and categorize their data. It is a change in approach and requirements but the degree of change we're talking about is not an insurmountable leap by any means." ■



Balancing the Needs of Safety Management and Effective Justice

ICAO safety auditing activities and other information gathering instruments have identified that there is a generally low compliance rate and level of general knowledge in its Member States with respect to the provisions relating to the protection of aviation safety information.

In order to address these concerns and develop a clearer and more comprehensive framework governing the protection of aviation safety information and the access sometimes required to it by judicial and administrative authorities, ICAO established its Safety Information Protection Task Force (SIP TF) earlier this year.

As Jimena Blumenkron of ICAO's Integrated Safety Management Section reports, 35 aviation experts from the aviation safety, accident investigation and legal domains attended the inaugural SIP TF gathering, elaborating the complex priorities of all stakeholders and defining the process that will guide the group as it determines solutions that are respectful of the needs of aviation safety while allowing for the effective administration of justice.

Jimena Blumenkron works with ICAO's Integrated Safety Management Section. Before coming to the Organization she served as a clerk to the Supreme Court of Justice of Mexico in Mexico City and as counsel at the Mexican Airline Pilots Association (ASPA de México). She has also advised international and national organizations, authorities, companies and associations in aviation and policy related matters, including the International Federation of Air Line Pilots' Associations (IFALPA).

The enhancement of aviation safety relies substantially upon the effective collection, sharing, and analysis of a constant flow of reliable and relevant safety data. The protection of this information over the years has helped to assure aviation's open and effective access to it and has contributed significantly to air transport's excellent safety performance record.

Sometimes conflicting with this primary aviation concern, however, is the dual and equally important need of law enforcement and prosecutorial authorities to gain access to safety information. This is required in order to ensure that justice is served in those instances where reckless conduct, gross negligence or wilful misconduct may have contributed to the air transport event at hand.

Balancing the need for the administration of justice while avoiding any detrimental impacts on the willingness and ability of aviation stakeholders to continue sharing safety data remains a complex and challenging process.

It was very much with these concerns in mind that ICAO established its new Safety Information Protection Task Force (SIP TF), which met for the first time in May 2011. The primary objectives of the new task force, as outlined by ICAO Air Navigation Bureau Director Nancy Graham and ICAO Legal Affairs and External Relations Bureau Director Denys Wibaux in their opening remarks, will be to develop an adequate protective legal framework for safety information and ensure its continued availability for the design and management of safety policies and programmes, while similarly ensuring its availability for the proper determination and administration of justice.

Dr. Jonathan Aleck (Australia) and Kenneth P. Quinn (Flight Safety Foundation) were elected as Chairman and Vice-Chairman respectively at the SIP TF inaugural gathering. In accepting his election as SIP TF Chairman, Aleck recalled that safety and justice should not be thought of as mutually exclusive and that the work of safety and judicial/legal authorities should be regarded as complementary.

"The principles for the protection of safety information which are to be analyzed by the SIP TF should support the latest aviation safety objectives while allowing for the proper administration of justice," Aleck noted. "In this regard an effective communication strategy promoting the use of safety information for demonstrably safety-related purposes between safety, judicial, and other relevant authorities is essential."

Vice-Chairman Quinn, in accepting his election, stressed the difference and difficulty between the concepts of appropriate versus inappropriate use of safety information. He supported the view of the air transport community that the use of safety information for exclusively safety-related purposes does not imply immunity for aviation in the scope of society's broader needs for justice and the rule of law.

"Safety enhancements strongly rely on the continuous availability of safety information," Quinn emphasized. "Model legislation represents one possible solution which could assist States in better implementing the provisions regarding the protection of safety information."

Quinn went on to recognize that, although the SIP TF membership comprised accident and incident investigation professionals, safety experts, and legal and policy specialists, the new multidisciplinary body could also benefit significantly from the inclusion of stakeholders from the law enforcement and judicial community, as well as representatives of accident victims and their families.

Categories and Scope of Safety Information

It was generally expressed that clear identification of types and scope of safety information would be required to

"Balancing the need for the administration of justice while avoiding any detrimental impacts on the willingness and ability of aviation stakeholders to continue collecting and sharing safety data remains a complex and challenging process."

progress the work of the SIP TF. Related proposals called for the need to develop a process for authorities—legal, administrative and judicial—to identify the different categories of safety information subject to (and excluded from) protection under current rules and processes. Development of a new framework for the enhancement and refinement of those protections was also suggested.

Speaking to these objectives, ICAO Technical Officer Dr. André de Kock made a presentation introducing the distinction between safety data and safety information. He also specified the originators of such data and information, including accident and incident investigations, voluntary and mandatory reporting systems and flight operations quality assurance systems.

De Kock stressed the principles and objectives of accident and incident investigations contained in Annex 13 to the Chicago Convention, highlighting that the sole objective of these types of investigations is the prevention of aircraft accidents and incidents, and not to apportion blame or liability. He also explained that, in accordance with current ICAO provisions, the disclosure of accident and incident records is subject to the determination of the appropriate authority for the administration of justice. He continued his presentation by identifying the records obtained from investigation activities that include: personal statements, communications of persons involved in the operation of the aircraft, medical or private information, cockpit voice recordings and its transcripts, air traffic control recordings and its transcripts, cockpit airborne image recordings, and the analysis made from such records.

Captain John Illson, Chief of ICAO's Integrated Safety Management Section, presented a briefing to the SIP TF on safety management initiatives that ICAO is undertaking. He pointed out that ICAO is developing a new Annex addressing the safety management responsibilities of States, framed under the State Safety Programme (SSP). Illson also mentioned that this Safety Management Annex should facilitate the provision of safety information from States as well as service providers to the travelling public.

While explaining the benefits of safety management initiatives, Illson noted that the identification of safety issues and the assessment of related risks to develop effective mitigation strategies rely on the continuous collection, analysis, and subsequent sharing of safety data and safety information. Since the use of safety information for purposes other than those related to the promotion of safety may inhibit the future availability of such information, Illson stressed the necessity to review current ICAO provisions and guidance material related to the protection of safety information to develop an adequate framework designed to accomplish safety management objectives.

The meeting acknowledged that the protection of safety information from inappropriate use is essential to ensure the continued availability of all relevant information for safety enhancement. When determining the competent authority to decide upon the disclosure of safety information, it was suggested that principles governing any disclosure or non-disclosure should specify the factors a court should consider when making these determinations and that these factors should be part of the principles of protection to be developed by the task force. It was furthered mentioned that penalties might be considered for breaching safeguards of non-disclosure of safety information.

The meeting also recognized the effect of safety information on the general public and the media, especially when accidents or incidents occur. It was proposed that relevant operational definitions of *public interest* and related principles for public disclosure of safety information be developed. In this context, it was considered that an assessment of existing legal limitations on the protection of safety information, including principles of free access to information and possible exceptions may be also necessary.

Path Forward

To facilitate the work of the SIP TF, three working groups were proposed, maintaining a multidisciplinary composition in order to best reflect the structure and objectives of the task force. The working groups were identified as follows:

Working Group 1: Review of existing ICAO SARPs and ICAO guidance material related to the protection of safety information.
Working Group 2: Review of existing and proposed Member States' legislation, regulation and practice related to the protection of safety information.
Working Group 3: Outreach, communication, and engagement of safety, administrative, judicial, law enforcement, legal, and prosecutorial, along with victims' support groups.

It was agreed that the terms of reference of the proposed working groups, as well as their composition, would be circulated among the participants as soon as possible, as per coordination between the Chairman, the Vice-Chairman and the ICAO Secretariat. ■

INTERNATIONAL AIRPORT PROFESSIONAL

Global ACI-ICAO Airport Management Professional Accreditation Programme (AMPAP)

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"It's the only programme of its kind that provides airport managers with a graduate-level curriculum that leads to a joint accreditation from ICAO and ACI, the industry's most influential global organizations. For me, AMPAP equips its participants with a robust understanding of the strategic and operational perspectives of aviation and airport management. It also opens a gateway to its active worldwide community, which shares and promotes industry best practices."

Robert W. Kennedy, IAP,
Interim Deputy General Manager,
Hartsfield-Jackson Atlanta International Airport

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Staying 'Safety–smart'

As the improvement of aviation safety continues to become a more data-driven and data-focused effort, ICAO has reviewed and revised the processes and tools at its disposal in order to provide global air transport stakeholders with the safety information they require more efficiently than ever before.

As this process has proceeded, it's become clear that these efforts can only succeed through a more collaborative framework; one that enables both improved data collection and dissemination on sector-wide basis. The aviation community has answered this call and the result has been the implementation by ICAO of a new series of safety data and analysis tools that are helping make air transport safer today than ever before.

ICAO has continued in recent years to develop documents, databases and web sites that help it to collate and disseminate the safety-related information collected through its various and often proprietary sources to its Member States and the broader aviation community.

It has become evident as this process has continued that there was a clear need to create new tools for this purpose to provide improved access to the Organization's numerous data services.

To respond to these challenges, ICAO embarked on the development of a set of new electronic safety tools and a supporting framework featuring a seamless electronic interface that could present and deliver safety data in various forms across multiple platforms. As the requirements of this framework became more clearly defined, they highlighted that it would require a united effort on behalf of the entire aviation community in order to enhance related data collection processes and ultimately improve safety analyses and outcomes on a more sector-wide basis.

ICAO's initial step towards developing such an integrated system was to begin consolidating data into fewer database systems so that the aviation data provided by States became flexible enough to provide seamless and inter-connected services. Existing safety data systems were grouped for this purpose into three main categories: Standards and Recommended Practices (SARPs); aircraft operations; and geo-referencing data.

The new 'Safety-smart' concept that underlies this new approach is based on the fact that, when implemented properly, a grouping of cohesive safety tools yields outcomes that are greater than the sum of their parts, generating more actionable safety information.

Design and Implementation

Two important perspectives are taken into consideration in the design elements: how to make it more efficient to collect and update data and how to make it easy for users to find/navigate information that they are looking for.

In order to modernize the process of collecting and/or updating data, the design elements for the new safety tools (which are now either offered or under consideration) are to introduce simplified and automated workflows.

These simplified workflows will provide States with direct access to electronic data which they can consult and/or update in a timely manner. Member States will therefore now have access to systems that enable them to track the progress of requests for updating information when requiring ICAO approval and/or validation.

Parallel efforts are also underway to ensure that Individual safety tools can be accessed with a single user ID and password through a customizable user interface. The layout of this user interface is solely based on requirements of different user groups.

The safety tool implementation strategy consists of two primary endeavours. The first is the creation of a new web-based 'dashboard' that will allow States to securely login and monitor the accuracy and the currentness of their own safety data. The second is the development and delivery of a new State Training Package which emphasizes the importance of data currency and provides tutorials on how to use the tools.

"The safety tool implementation strategy consists of two primary endeavours. The first is the creation of a new web-based 'dashboard' that will allow States to securely login and monitor the accuracy and the currentness of their own safety data. The second is the development and delivery of a new State Training Package which emphasizes the importance of data currency and provides tutorials on how to use the tools."

Development and Rollout Principles

The vision behind ICAO Safety-smart design will require developers to create a system based on three principles which were presented during the 37th ICAO Assembly in 2010:

- Trace-ability to safety objectives and priorities of the regional and global plans.
- Seamless transition.
- Scope of and access to data.

With respect to trace-ability, the design principles being followed ensures that the mandate and vision proposed by ICAO facilitates the use of collected safety data by States and global/regional decision making bodies such as Regional Aviation Safety Groups (RASGs) and Planning and Implementation Groups (PIRGs).

A seamless transition is required to minimize interruptions of the existing system. States are currently notified at least six months in advance of changes or additions to new system protocols that deal with safety data collection. ICAO is determined that all State users are satisfied with the proposed changes prior to any implementation to ensure transparency.

Regarding matters of access, ICAO will ensure that only data that has been mandated will be collected and shared and access to the data will be consistent with all existing ICAO policies. As new data becomes available, ICAO will ensure that proper endorsement is attained from States, stakeholders and relevant government bodies prior to any additional development or system upgrades.

New 'Safety-smart' Tool Sets

ICAO has been at work for some time now on a suite of electronic safety tools which includes the ICAO aircraft information system, an electronic State letter system and an electronic Filing of Differences (e-FOD) system.

This suite has now been expanded into three sets of electronic tools geared specifically towards SARPs Management and Reporting Tools (SMART), an Online Aircraft Safety Information Service (OASIS) and GIS-related tools.

SMART (SARPs Management and Reporting Tools)

The e-FOD system provides an alternative means for States to file their differences to 16 of the 18 ICAO Annexes. Ongoing work to enable the platform to be recognized as a primary means for filing differences to all Annexes includes the following:

- Validation by States of the compliance and difference information submitted for the purposes of the Universal Safety Oversight Audit Programme (USOAP).
- The establishment of a clear policy with respect to the use of e-FOD for filing and sharing difference and compliance information.
- The inclusion of all Annexes.
- The deployment of a training programme for all States.

Figure 1: User Interface for Completing Compliance and Difference Information from the e-FOD System

Figure 2: A Report on Compliance/Differences Information of a State, Generated from the e-FOD System

Other enhancements to the system will enable States to dynamically research the differences and compliance information of other States managed through the system. The work and design improvements to e-FOD are expected to be completed by the end of 2012.

Also part of the *SMART* tool kit, the Air Navigation Commission (ANC) has been working closely with the Secretariat to develop an electronic version of the State Letter instrument which is employed to gather State and international organization views on proposals for amendments to the Annexes and Procedures for Air Navigation Services (PANS).

The e-State Letter system will be tested over the summer with various ICAO Members. Based on the feedback received during this testing phase the ANC will finalize its work on the format of the e-State letter and the Secretariat will implement the tool in time for the 2013 amendment proposals.

OASIS (Online Aircraft Safety Information Services)

The *OASIS* package was originally designed to collect and share safety data related to aircraft and their operator and owner information, based on the aircraft registration component. OASIS will be expanded to contain components such as Air Operator Certificate information and Ops-Spec information, as well as other aircraft and air operator related information currently contained in *Designators for Aircraft Operating Agencies, Aeronautical Authorities, and Services* (Doc 8585) and *Aircraft Type Designators* (Doc 8643).

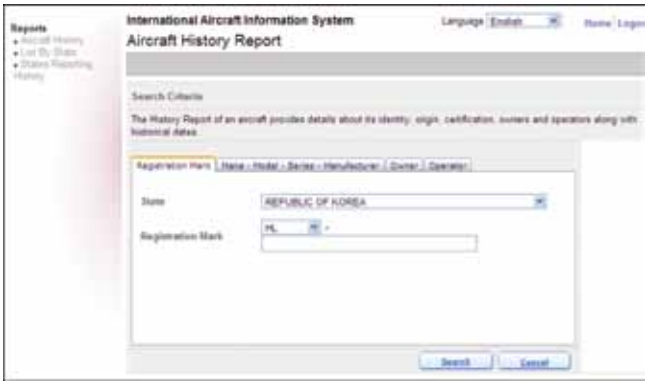
This will make *OASIS* unique in that any information entered into it will automatically update multiple data sets, reducing duplication and incorrect data entry opportunities.

The aircraft registration component of the application was made available to States for data entry on 1 November 2010. States can provide their data using the online-entry facility, pre-formatted Excel template or having data entered via downloads from the database of the International Register of Civil Aircraft (IRCA), an ICAO-accredited service provider. At the time of this printing, aircraft registration data from thirty States are available in the system.

Although the system has been launched, final ratification of agreements between the IRCA and the remainder of its Member States is still pending and, once complete, IRCA data can begin being uploaded to the aircraft registry system.

Figure 3: Screen for Search Aircraft by State, from the Aircraft Registration System (ARS)

Figure 4: Aircraft History Report that can be Dynamically Generated from the ARS



At present, work is being carried out to refine the data upload procedure via an Excel template tool and to complete development of AOC components of the system. Improvements and additional updates to the Help/Training facilities are also in the process of being completed. These upgrades and improvements are projected to be completed by the first quarter of 2012.

GIS-related tools

The *GIS-related* 'Safety-smart' tools will integrate existing geo-referencing data onto a single platform that maps multiple layers of safety data; including accident and incidents, safety audits results, potential hazards (such as weather), elevation and economic growth.

The *GIS* platform will also serve as the basis for electronic Air Navigation Plans (ANPs). One of the many tools at the heart of air navigation decision-making is a database known as ICARD (International Codes and Route Designators system). ICARD was originally developed by EUROCONTROL to assist with the allocation and management of Five Letter Name Codes (5LNCs) used to define air routes. After the successful transfer of the ICARD database to the ICAO Headquarters portal on 27 August 2010, the ICAO European and North Atlantic (EUR/NAT) Office organized an ICARD User Forum in Paris in September 2010.

It was evident at this forum that there is an increasing demand by the sector to make use of ICARD for functions other than what it had been initially designed for. An ICARD Task Force is presently investigating its potential in this respect and is developing suitable operational and technical requirements as needed. All ICAO regional offices will become fully integrated to ICARD by the end of 2011.

Figure 5: User Interface for a Request for Code Allocation from the ICARD System

Figure 6: Search for Code Duplicates in nearby FIRs from the ICARD System

Ultimately, it is evident that GIS prototyping will make possible the creation of other sub-tools for consulting, updating and tables associated with ANPs. The entire GIS-related tool set will increase situational awareness of global and regional safety levels and provide transparency to the content and status of ANPs.

In this triennium, safety has remained a vital focus for ICAO and the Organization stands firm in its belief that it is essential to revamp and improve the ways in which data is collected. It is only through this type of continuous attention and evolution that system tools can be assured to stay user-friendly and efficient, and most importantly that access is readily attained by all States and stakeholders. ■

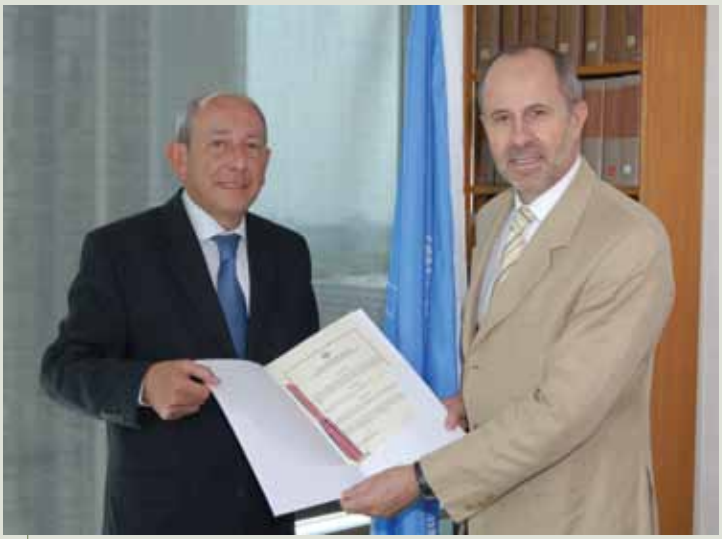
Assad Kotaite Fund to Assist Prospective Aviation Personnel in Developing Nations

Established in March 2006, the objective of the Assad Kotaite Graduate and Postdoctoral Fellowship Fund (Assad Kotaite Fund) is to promote the safety and development of civil aviation by strengthening the capabilities of national civil aviation personnel in developing countries. This will be achieved through the provision of bursaries for students in high-level training programmes, as well as graduate and postdoctoral studies, conducted at internationally-recognized academic institutions, training centres and universities.

The main beneficiaries of the Assad Kotaite Fund shall be eligible candidates from developing countries that are most in need of assistance, especially in the area of aviation training. ICAO, through its Technical Co-operation Bureau shall administer the Assad Kotaite Fund.

This year, the Assad Kotaite Fund will be awarding bursaries of $10,500.00 to candidates who meet the required criteria. National civil aviation authorities are encouraged to promote the Assad Kotaite Fund to personnel willing to submit applications.

For further information on how to apply for a bursary from the Assad Kotaite Fund, please consult the ICAO web site at **www.icao.int** and look for the Assad Kotaite Fund link, or else contact the ICAO Fellowships Unit directly via **fsu@icao.int.** The deadline for applications is 1 September 2011. ■



Shown on the occasion are His Excellency Luis Carlos Delgado Murillo, Ambassador of Costa Rica in Canada (left) and Denys Wibaux, Director, Legal Affairs and External Relations Bureau (right).

Deposit by Costa Rica

Costa Rica deposited its instrument of ratification of the Montreal Convention of 1999 during a brief ceremony at ICAO Headquarters on 9 June 2011. This brings the total number of parties to the Convention to 102. ■

Sixth Meeting of the World Area Forecast System (WAFS) Operations Group

The Sixth Meeting of the World Area Forecast System (WAFS) Operations Group (WAFSOPSG/6) took place at the ICAO Western and Central African Regional Office (WACAF) from 21 to 24 March 2011.

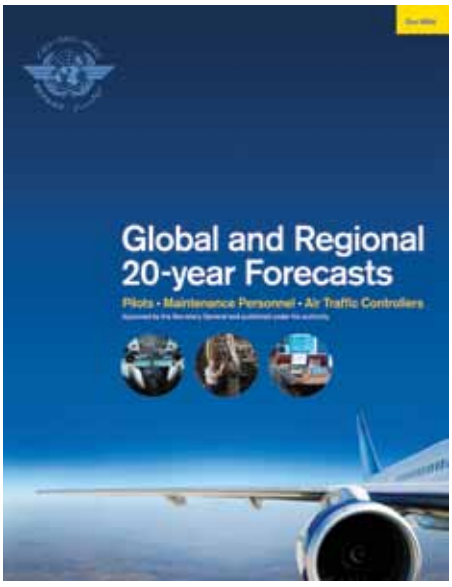
The meeting was attended by 21 participants from ten States, including the two Provider States that host World Area Forecast Centres, as well as by relevant organizations. They reviewed WAFS-related provisions in ICAO Annex 3 and relevant air navigation plans.

In addition to addressing a number of issues related to the operation, implementation and future of the WAFS, the meeting proposed that these forecasts should be now considered fully operational in view of associated improvements in the quality of the gridded WAFS forecasts for cumulonimbus clouds, icing and turbulence. ■

ECCAIRS Certifies New Pacific-based Personnel

A European Co-Ordination Centre for Aviation Incident Reporting Systems (ECCAIRS) Training (Technical Course and End-User) Course was carried out at the Headquarters of the Civil Aviation Authority of the Fiji Islands (CAAFI) in Nadi, Fiji, from 11 to 13 May and 16 to 20 May 2011 respectively.

The ECCAIRS training was organized at the request of Netava Waqa, Chief Executive CAAFI. Apart from CAAFI staff, the courses included participants from other Pacific Aviation Safety Office (PASO) States and Airports Fiji (in all Fiji, Papua New Guinea, Solomon Islands and Vanuatu were represented). The courses were led by ICAO Head office ECCAIRS instructors Thomas Mistos and Sharron Morin, who certified 24 end-users and eight technical users. ■



Supporting New Approaches and a New Vision for Aviation Human Resource Planning

In early 2011, ICAO's Economic Analysis and Policy (EAP) Section published what is already becoming an essential reference for aviation planners and researchers across a variety of air transport domains.

Entitled *Global and Regional 20-year Forecasts for Pilots, Maintenance Personnel and Air Traffic Controllers* (ICAO Doc 9956), it provides an independent study of these important categories of civil aviation personnel and represents an urgently needed and indispensable addition to the aviation data and traffic forecasts for which the Organization is globally recognized.

During the last decade, commercial air transport has demonstrated very strong traffic growth patterns, leading to the coming-to-market of many new aircraft operators and the highest number of aircraft orders ever registered.

"Over the next twenty years, the demand for qualified aviation personnel, notably pilots, aircraft maintenance personnel and air traffic controllers, will need to be correlated to current aircraft delivery plans," commented the Chief of ICAO's Economic Analysis and Policy (EAP) Section, Narjess Teyssier. "Using its breadth of civil aviation expertise, exclusive international networks of accessible data and decades of experience producing high-quality aviation information products, ICAO is now introducing world-class reference materials for civil aviation forecasters."

The Organization's newest forecasting publication, entitled *Global and Regional 20-year Forecasts for Pilots, Maintenance Personnel and Air Traffic Controllers,* provides a detailed analysis of these issues by comparing the number of new personnel needing to be trained each year with the respective annual capacities of the existing training infrastructure. This new manual is based on first-hand information collected from different air transport industry stakeholders, including the Organization's 190 Member States.

The conclusions drawn from this research and analysis by Teyssier and her team, reveal the respective personnel shortages (or surpluses, where indicated) globally and by region. Failure to quantify these shortages is no longer an option for the air transport sector. To hide from or otherwise ignore the new data revealed in ICAO's new *Global and Regional 20-year Forecasts* would lead to unnecessary constraints on air traffic growth and adversely affect the safety and efficiency of air transport operations.

Bridging a Widening Gap

Before the air transport industry crisis in 2008 and 2009, a situation very much orchestrated by unrelated collapses in global credit markets and skyrocketing fuel costs, the threat of a widening gap between available and required aviation personnel was seen as a potential traffic growth constraint in certain regions. The challenge for the industry today remains ensuring sufficient training capacities across industry sectors, States and regions, without compromising air transport's historically very high quality and safety standards.

Until recently, pressures in this regard artificially appeared to be eased since the airline industry was—and to a large extent still is—recovering from the decline in traffic growth due to the global financial and economic crisis while carefully managing the redeployment of its capacity. Difficulties may soon arise however, most notably when the additional demands for personnel, fuelled by projected traffic increases and fleet expansions, coincide with predicted retirement waves.

Human resources development and management must therefore strive to continuously improve the competency levels of safety-critical personnel, while taking into account interdependencies for supply and demand of qualified personnel at national, regional and global levels. Estimating current and future requirements for civil aviation personnel and training capacity in each region is essential for human resources planning, institutional capacity building, and related funding and policy measures.

Supporting ICAO's NGAP Training Priorities

The *Global and Regional 20-year Forecasts* also serves as an essential support tool as ICAO continues to coordinate global

aviation training responses to the projected shortages and retirement rate realities across these important personnel categories.

The Organization's Next Generation Aviation Professionals (NGAP) Symposium in 2010 proposed specific actions in two areas: the updating and modification of the regulatory environment in order to improve the effectiveness and efficiency of training and education; and the mobilization of the air transport community towards a common effort to 'revitalize' the image of aviation professions.

These challenges were addressed at last year's event by ten separate Panels made up of experts and specialists representing the full range of air transport stakeholders, including civil aviation authorities, airlines, Air Navigation Services Providers (ANSPs), training and education providers and other international organizations. A follow-up NGAP Task Force meeting was completed in February of this year and special NGAP Regional Conferences were held during 2011 in Incheon (Korea), Marrakech (Morocco) and Bucharest (Romania) in conjunction with and supported by ICAO's TRAINAIR *PLUS* initiative.

Doc 9956 is ICAO's initial response to demand in this area and is the first in a series of publications and tools that will provide data, analyses, and forecasts to all of these key stakeholders in the civil aviation industry.

"The first part of the study describes the methodology we have followed," noted *Global Forecasts* author and ICAO Air Transport Development Manager Frederic Malaud. "In the second part," he continued, "future air transport developments, including traffic movements and fleet growth forecasts are described. Based on these underlying conditions, personnel requirements are introduced in the study for the three aviation professions we've looked at. One of our objectives was to show imbalances between personnel supply and demand in a reader-friendly way, by using graphs and tables whenever appropriate." After a presentation of the results of the forecast, an overview of each region's particular situation is provided, including country case studies.

"Failure to quantify these shortages is no longer an option for the air transport sector. To hide from or otherwise ignore the new data revealed in ICAO's new *Global and Regional 20-year Forecasts* would lead to unnecessary constraints on air traffic growth and adversely affect the safety and efficiency of air transport operations."

Personnel Categories

The term 'licensed aviation personnel' is generally used in the context of civil aviation human resource management, referring exclusively to personnel performing functions described in Annex 1 and holding licences with appropriate privileges for that purpose. However, there is a general consensus in the civil aviation community to the effect that what needs to be addressed is the entire workforce that is capable of performing the functions described in Annex 1, whether by actual licence holders or by personnel under the responsibility of licence holders.

The personnel considered as part of the scope of the *Global and Regional 20-year Forecasts* study are therefore the following.

(i) Pilots (who must all be licensed), licensed maintenance personnel and licensed air traffic controllers.

(ii) Unlicensed civil aviation personnel such as:

   a. Air Traffic Controllers (ATCOs—in certain States, they may operate without holding a licence, in accordance with 4.4.1 of Annex 1).

   b. Aircraft maintenance personnel who do not fulfil the certifying functions allowed to the holder of an aircraft maintenance licence by 4.2.2.1 of Annex 1, or fulfil certifying functions when appointed by an approved maintenance organization (under 4.2.2.4 of Annex 1).

Despite the fact that personnel mentioned in category (ii) above do not hold licences, they are nonetheless instrumental to daily air traffic management or aircraft maintenance operations. They have therefore been taken into account in the quantification of future personnel requirements in the framework of this study.

Fleet Segmentation

The fleet considered for the *Global and Regional 20-year Forecasts* includes commercial aircraft (i.e. aircraft involved in the transport of passengers, cargo or mail for remuneration). It should be noted that most forecasts regarding fleets or personnel only take into account scheduled airline traffic and/or airline personnel, but the scope of Doc 9956 is wider and includes the staffing needs of other segments of commercial air transport as well.

This explains in part why some of the forecasts presented in the study may significantly exceed some recently-released estimates of pilot requirements.

Essential Information for Aviation Planners

ICAO's *Global and Regional 20-year Forecasts* serves as an essential support tool as the Organization continues to coordinate global aviation training responses to the projected shortages and retirement rate realities across several skilled aviation personnel categories. One of the book's main objectives is to reflect imbalances between personnel supply and demand in a reader-friendly way, including global graphs such as the one shown here depicting overviews of each region's particular situation. More detailed State case studies support the broader regional data.

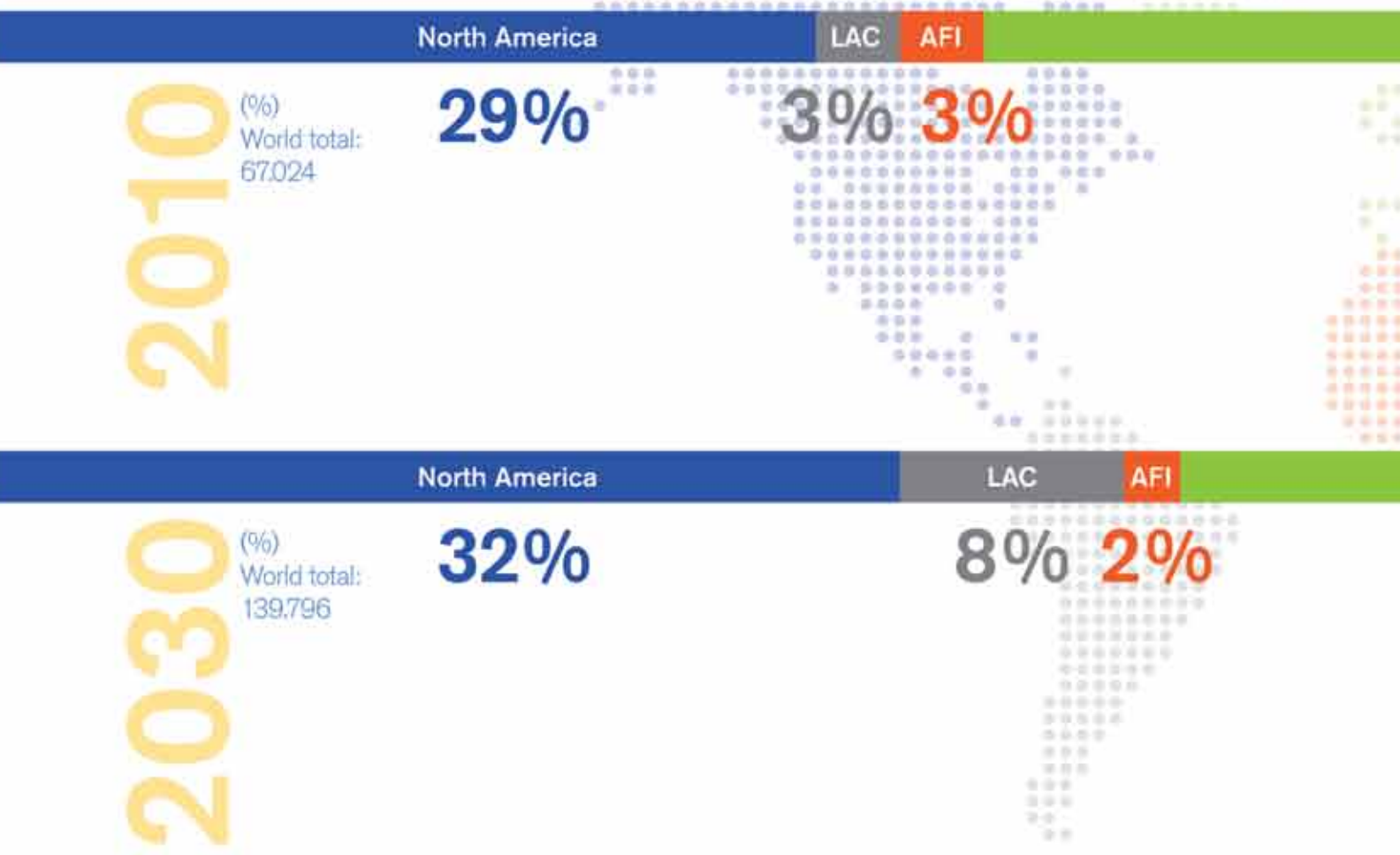
Air traffic controllers

The 2010 air traffic controller population

Europe has the largest reservoir of ATCOs, despite the fact that, in terms of aircraft movements, it comes only second after North America.

The graphs below illustrate the geographical distribution of existing (2010) and required (2030) ATCOs.

Geographical distribution of ATCOs 2010 and 2030



Europe	MID	Asia/Pacific
41%	3%	21%

Europe	MID	Asia/Pacific
23%	3%	32%

"Using its breadth of civil aviation expertise, exclusive international networks of accessible data, and decades of experience producing high-quality aviation information products, ICAO is now introducing world-class reference materials for civil aviation forecasters."

The commercial air transport fleet ICAO has considered is distributed into three groups:

- Passenger jet aircraft.
- Cargo aircraft.
- Other aircraft (includes executive, turboprop and piston-engine aircraft).

The geographical distribution of current and future commercial aircraft fleets is based on regions of State of Registry (i.e. the State on whose registry the aircraft is entered), not on regions of State of the Operator (i.e. the State in which the operator's principal place of business is located or its permanent residence). This is consistent with the geographical distribution of aviation personnel, which has been established on the basis of State registries.

When interpreting the results of the forecasts, account should be taken of the fact that aircraft may be operated in States other than their State of Registry, for example, in the context of aircraft leasing arrangements. In such cases, aircraft are still recorded on the State of Registry, even though they are operated in a different State.

The Personnel Forecasting Process

Forecasts of future personnel requirements are based both on fleet forecasts (by applying specific ratios of personnel per aircraft for pilots and maintenance staff) and on aircraft movement forecasts (by applying ratios of aircraft movements per person for ATCOs requirements).

For the purposes of estimating the requirements for aviation professionals in 2030, additional assumptions linked to human resource management and training capacities have been used. An important factor to be taken into account is the attrition rate, which corresponds to the reduction (on an annual basis) in the number of professionals—mainly as a result of resignation, retirement or death.

As civil aviation licensed personnel are subject to medical fitness requirements, loss of medical fitness is also a cause of attrition, as well as expatriation and upgrade to captain status for co-pilots. When levels of required personnel have been determined following the methods described below, an annual attrition rate has been applied to the total number of professionals operating the year before.

Regarding the training capacities data, they have been extracted from ICAO databases. This information was validated whenever necessary with external or other data. To ascertain possible shortages or surpluses, training capacities have been considered constant over time. The projections carried out in the framework of this study therefore constitute, to a certain extent, a 'worst case scenario', since they assume unchanged training capacities.

Main Findings

Pilots

The 'most likely' scenario of the forecast shows the annual number of new pilots required to be 52,506, with a commensurate training shortage of -8,146 pilots per year. In essence, this means that the worldwide training infrastructure should train over 8,000 more professional pilots than it is capable of training today in order to meet the needs of the air transport industry.

Maintenance personnel

The forecast indicates that 70,331 new maintenance personnel should be trained globally each year, which translates into a training shortage of -18,071 annually at present capacity.

ATCOs

The forecast reveals the annual number of new ATCOs required being 8,718, representing a training capacity shortage of -1,978.

Regional breakdowns are provided in the study, as well as different scenarios depending on the number of personnel (pilots and maintenance personnel) allocated per aircraft. The impact of incoming retirement waves, as well as the introduction of new operational improvements and advanced ATM systems, such as SESAR and NextGen, is also taken into account through specific case studies. ■

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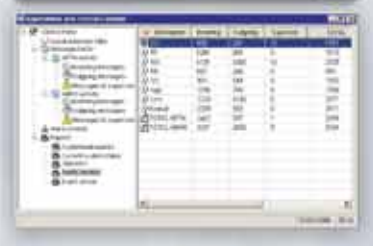

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