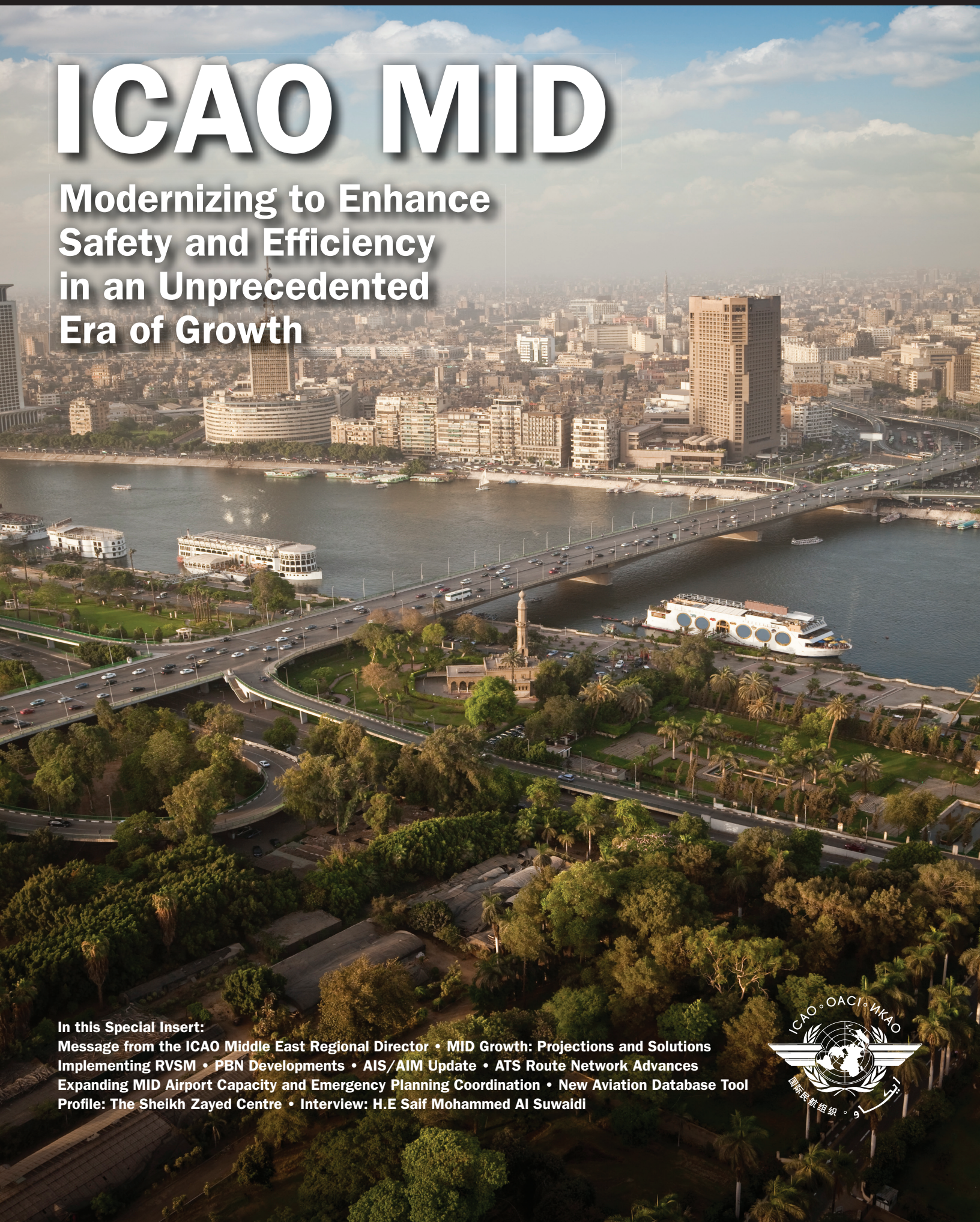

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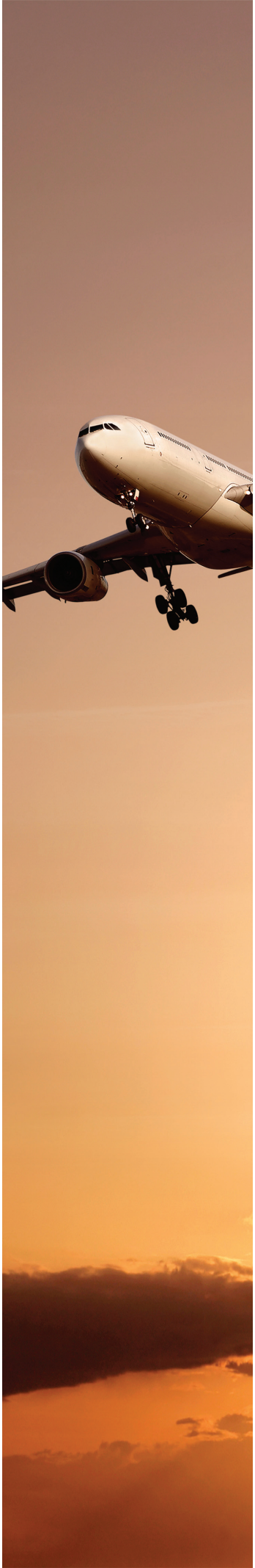

ICAO MID Regional Report: Contents

Developing Strategic Solutions to MID Challenges

Mohamed R. M. Khonji
ICAO Regional Director
Middle East Office, Cairo

Salam-u-aleikum

(Peace be upon you)

It is with these words that I would like to extend a greeting to all readers to the ICAO Middle East (MID) Regional Office. We have been located in Cairo, Egypt, since 1953, based on an agreement with the Egyptian Government. The Office is presently staffed by 8 International staff and 10 General Service staff and, with seven separate nationalities represented, ICAO's MID presence truly has an international feel.

Our Regional Officers furthermore reflect a wide range of expertise, specializing as they do in the areas of Aerodromes, Aeronautical Information Management (AIM), Air Traffic Management (ATM), Communications, Navigation and Surveillance (CNS) and Aircraft Operations/Flight Safety (OPS/FLS) respectively.

The MID Office presently serves 15 States of the Middle East Region, and coordinates with adjacent ICAO Regions in Africa (AFI), Asia-Pacific (APAC) and Europe (EUR). Three distinct, homogenous areas comprise the MID Region's primary territories of responsibility:

- *The Gulf Area* (Bahrain, Iran, Oman, Saudi Arabia, UAE and Yemen) interfacing with Asia.
- *The Red Sea/Western Mediterranean Area* (Egypt, Sudan, Libya, etc.) interfacing with Africa.
- *The Eastern Mediterranean Area* (Lebanon, Iran, Iraq, Syria) interfacing with Europe.

It can be said that, although the Middle East is not a big Region, it is a volatile one. Even a relatively simple administrative task in some parts of the world, such as inviting representatives from local States to a Regional Meeting, can in our Region involve days and sometimes weeks of side discussions and shuttle diplomacy.

With a limited number of staff working under strenuous conditions of this nature, these responsibilities can take their toll. This helps to explain why the support and appreciation of ICAO Headquarters is of constant importance to myself and my staff.

The MID Region today serves as a bridge between Asia/Pacific and Europe, which in many ways are ICAO's most

OBJECTIVES OF THE ICAO MIDDLE EAST (MID) REGIONAL OFFICE

- Meet the needs of the people of the world regarding their safe, regular, efficient and economical air transport, through the development of airways, airports and air navigation facilities for international civil aviation.
- Encourage, expedite, coordinate and follow-up on the implementation of up-to-date Air Navigation Plans.
- Provide all possible help, advice, guidance, and assistance to air transport stakeholders within the ICAO MID area of accreditation.
- Foster a culture of constant improvement regarding international civil aviation safety, security and legislation.

dynamic Regions. The Middle East is a strategic location with significant volumes of transiting air traffic using its airspace, and therefore has a dual role in both planning for itself (it features the world's highest rate of air transport growth) as well as facilitating en route traffic to and from Africa, Asia and Europe.

The MID Office in Cairo serves as a focal point where air transport executives from local States can openly exchange their views. Our diversity of cultures allows these stakeholders to cooperate harmoniously in an environment where mutual interests and shared problems are intelligently managed and mediated.

The MID Region's success has been and continues to be achieved through the development of airports, air navigation facilities and new performance-based routes for international air transport. MID's success is further reflected in its implementation of associated policies and guidance developed at ICAO Headquarters.

Nevertheless, there remain in the Middle East a range of challenges that air transport stakeholders have neither overcome nor even addressed. How, for example, can Baghdad safely implement Reduced Vertical Separation Minima (RVSM) when Iraq is still at an evolutionary stage of civil aviation? Other urgent issues facing MID, as indeed all other Regions, include the participation of Member States in training programmes relating to aviation security.

There do remain shortfalls in the required expertise and manpower to meet even some of our present demands, not to mention money, yet I remain optimistic about these challenges given ICAO's demonstrated ability to stay ahead of events.

Now that I have given an overview of the MID Regional Office and the Region, please allow me to highlight some of the activities, and projects that the Office and the Region are embarking upon, mainly through the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) and its subsidiary bodies.

MIDANPIRG is a grouping of 13 MID States that are listed in the MID Basic Air Navigation Plan (ANP) i.e. Bahrain, Egypt, Iran (Islamic Republic of), Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates (UAE) and Yemen.

MIDANPIRG was established by the ICAO Council in 1993 and held its first meeting in November, 1994. It has matured in the 14 years since, transforming the Middle East into a developed and active Region.

As I indicated earlier, the MID Region's unique geographic location means that improvements to air transport operations and infrastructure here contribute not only toward the enhancement of Regional safety and efficiency, but also to related worldwide metrics.

It is to be noted that the rate of investment in our Region is among the highest in the world, even despite the temporary difficulties encountered due to our present global recession. Though some MID States have been significantly affected by this recession, the strong foundations that have been laid by most MID States, in addition to the strategic planning and entrepreneurial vision that have been the hallmarks of the MID aviation sector, have meant that air transport has suffered far less than other sectors over the past several years.

I would like to take the opportunity of our first *MID Regional Report* to highlight my appreciation and gratitude for all the MID experts, within their respective States, competencies and capacities, who have made this progress possible. ICAO's leadership and outreach have served to nurture and to guide the many strategies, recommendations and projects that have resulted in the significantly enhanced levels of safety and efficiency we now enjoy in our Region.

MID air navigation service provision continues to become more efficient and modernized to better serve Regional aircraft operators. Notable contributions in this regard include a number of projects that have either been completed or are now in advanced planning stages, including RVSM implementation *(see more on the Baghdad FIR on page 10)*, the MID Regional Monitoring Agency (RMA), Performance-based Navigation (PBN), State Safety Programme adoption (SSPs), Safety management Systems implementations (SMS), automated ATC Systems, Automatic Dependent Surveillance–Broadcast (ADS-B) trials, wider employment of the Electronic Terrain Obstacle Database (eTOD), Airport Certification activities, etc.

I would be remiss not to highlight recent improvements to the efficiency of MIDANPIRG, which has been one of the most important objectives of the MIDANPIRG Steering Group (MSG). The MSG was established to consider management, administrative and more urgent technical issues related to MIDANPIRG and it has done an excellent job of minimizing associated formalities and streamlining the decision-making capabilities of this essential MID aviation oversight Group.

ICAO has been moving forward in a much more strategic manner in recent decades. At the recently-completed 37th General Assembly, the Organization further focused its priorities and objectives around three key Objectives: Safety, Security and Improved Environmental Performance. With respect to the Organization's Safety-related goals, I would like to highlight that the MID Region is still progressing based on the decisions and action plans ratified at the most recent MID Aviation Safety Summit (Abu Dhabi, 2008), as well as the twice-yearly meetings of the new Top Level Safety Team (TLST, formed November 2008).

All of these activities are guided by ICAO's Global Aviation Safety Roadmap (GASR), and I would take the opportunity of this writing to encourage any MID States not already doing so to take part in and join the TLST and help to contribute to its important work over the coming years.

One aspect of MID Region leadership and guidance that is lacking in some respects is a regular event bringing together all the strategic planners and other high level experts in charge of civil aviation in ICAO's MID Member States. This would be best satisfied by a regular event bringing together MID Directors General of Civil Aviation (DGCAs). This would allow MID aviation leaders to establish clearer, shared priorities for the Region, agree specific projects, and address at the highest level other issues with a view to ensuring the safety and efficiency of air navigation and other operational components of an effective and modernized air traffic system.

One such issue is the prevalence of long standing air navigation deficiencies, especially those classified presently as Priority "U" (Urgent). I am therefore currently seeking to organize a first meeting of MID Region DGCAs some time in 2011.

I would like to take this opportunity to wish all readers of our Report a pleasant and informative journey through the many accomplishments reflected in the expert reports that follow this introduction. The MID Region faces some extraordinary challenges in the years ahead as it accommodates its projected rapid growth, but I remain confident and ambitious with respect to the solutions that MID stakeholders are capable of putting forward. ■

Mohamed R. M. Khonji
ICAO Regional Director
Middle East Office, Cairo

Regional experts and administrators from the ICAO Middle East (MID) Regional Office in Cairo, Egypt.

Meeting the Challenges

Traffic growth, along with the commensurate infrastructure and airspace challenges that accompany it, are presently expected to remain stronger in the MID Region over the coming decades than in any other area in the world.

Jehad Faqir, ICAO MID Regional Office Deputy Regional Director and Technical Team Leader, discusses here the challenges and solutions that ICAO is helping to lead as MID airports, ANSPs and many other State and industry stakeholders begin to address local capacity needs with cutting-edge technical solutions and newer, more business-oriented approaches to air transport-related operational and personnel concerns.

Jehad Faqir is a Jordanian national with over 30 years of aviation industry experience. Prior to joining ICAO in 2007, Faqir held numerous managerial positions at Royal Jordanian Airlines, where he had been active since 1976 in postings and portfolios encompassing engineering developments, technical planning, avionics maintenance and IT. During that period he was also actively involved with various Regional organizations including ICAO, the Arab Civil Aviation Commission (ACAC), and the Arab Air Carrier Organization (AACO). He was also the Vice Chairman of the AACO Operations Committee and head of its Avionics Subcommittee for 12 years.

In 2000, Faqir joined IATA's Middle East Office as Director—Safety, Operations & Infrastructure, with responsibilities covering the technical & operational aspects of airport and air navigation services, CNS/ATM developments and implementation, as well as matters related to Regional flight safety.

The Middle East air transport industry has experienced steady growth for nearly two decades now. Apart from a slight downturn in early 2001, occasioned by the events of 9/11, the Region began to show signs of recovery again as early as 2002.

The steady rise in oil prices since 2002 has also helped the economies of the MID Region grow at faster rates through higher trade volumes and increased investment—particularly in construction projects and tourism-related activities. The impact of the global financial crisis on the economy of the Region has been generally well-managed to this point, with little implications for overall Regional economic strength.

In the long run, the MID Regional economy is expected to maintain a higher than world average rate of growth.

Annual passenger traffic growth has accelerated to a significant degree, reflecting heightened economic activity in the Gulf Area and Saudi Arabia primarily. It is currently estimated that air traffic to, from, and within the Middle East Region will increase at an average annual rate of 8.2 percent for the period 2007–2025.

Intra-Middle East traffic (from MID State-to-MID State) is expected to experience the highest average annual growth rate—some 11.4 percent per year. Forecasts of aircraft movements, meanwhile, are presently expected to increase at an average annual rate of 7.6 percent.

This decidedly healthy growth is forecast to sustain itself, as earlier noted, until 2025. While this is no doubt a very positive development, the growth will not continue without presenting Middle East airports and Air Navigation Service Providers (ANSPs) with huge challenges in terms of capacity developments, required infrastructure, the restructuring of the current ATS route network taking into account identified major traffic flows, and lastly the provision of modern airport services. All of these developments must be accomplished while maintaining or improving the safety of associated operations.

Table 1: Forecasts of scheduled passenger traffic to the year 2030 for airlines of middle east region

	Passenger-kilometres (thousand-million)					Average Annual Growth (percent)			
	Actual		Forecast			1999	2008	2010	2010
	1995	2008	2010	2020	2030	2009	2010	2020	2030
Middle East	80.7	253.4	245	415	675	9.2	-1.6	5.4	5.2
International	69.9	237.8	230	391	635	9.9	-1.7	5.4	5.2
Domestic	10.8	15.6	15	25	39	2.8	-0.5	4.8	4.8
World	**2,476**	**4,509**	**4,436**	**7,111**	**11,028**	**4.7**	**-0.8**	**4.8**	**4.7**

Table 2: Forecasts of scheduled freight traffic to the year 2030 for airlines of middle east region

	Freight-Tonne Km (millions)				Average Annual Growth (percent)			
	Actual		Forecast		1989	2009	2020	2009
	1989	2009	2020	2030	2009	2020	2030	2030
Middle East	2,570	10,938	25,348	52,438	7.5	7.9	7.5	7.7
International	2,481	10,861	25,195	52,170	7.7	8.0	7.6	7.8
Domestic	89	77	153	268	-0.7	6.4	5.8	6.1
World	**57,260**	**139,201**	**253,564**	**433,876**	**4.5**	**5.6**	**5.5**	**5.6**

"It is commonly held today in the MID Region that MID airports and ANSPs will need to become increasingly business- and enterprise-oriented and evolve away from the publicly run models that have been characteristic of MID facilities and navigation services in the past."

Throughout the MID Region in recent years, airport operators have responded enthusiastically to ongoing capacity challenges in order to ensure their continued growth and competitiveness. Many of the Region's States are also considering various private-sector or Private Public Partnerships (PPPs) as new alternatives for how best to operate and manage their airports and fund the huge investments that are required for associated infrastructure upgrades.

This trend is very positive and must be welcomed by all stakeholders. It is commonly held today in the MID Region that MID airports and Air Navigation Services Providers (ANSPs) will need to become increasingly business- and enterprise-oriented and evolve away from the publicly run models that have been characteristic of MID facilities and navigation services in the past. The challenge of airport and other infra-structure capacity developments is not merely a funding and investment issue. It is also about developing and nurturing high-level technical and managerial competencies in professional air transport personnel and providing the world-class service levels and proficient human resource base that today's operators expect and require.

One of the important challenges that the ICAO MID Regional Office will have to consider is how to increase the overall efficiency of the ATM system of the Region through improved airspace design and organization. The solutions in this regard must take into account projected traffic flows and not national borders. Analysis of 'doglegs' on existing ATS-Routes, for example, as well as many other efficiency- and ATM-related challenges, can be effectively addressed by promoting ICAO's Performance-based Navigation (PBN) concept.

Political sensitivities in the Region have also promoted extensive military restrictions which limit airspace expansion and cause serious route fragmentation. Operators are under immense operational pressure to improve related efficiencies due to increasing concerns regarding the environmental impact of air transport operations and the direct link between environmental performance and increased airspace flexibility.

The Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) has adopted several conclusions in support of improvement of MID ATS route structures, including promotion and adoption of the civil/military Flexible Use of Airspace (FUA) concept and dynamic and flex ATS route management. The ICAO MID Regional Office is additionally taking all necessary measures to foster the implementation of more efficient ATS routes that are critical to operational efficiency.

Another growth-related challenge requiring consideration and action is the completion of the implementation of Reduced Vertical Separation Minimum (RVSM) in the MID Region. Progress has been excellent thus far, with RVSM having been implemented in all MID States as long ago as 2003, with the exception of Iraq due to military conflicts ongoing at that time. Iraqi airspace, however, is considered by many as the MID 'super highway' providing overall Gulf Region access and ATM efficiency, and full Iraqi RVSM capability will undoubtedly bring major benefits to all airspace users by permitting additional flight levels and alleviating future capacity constraints. ■

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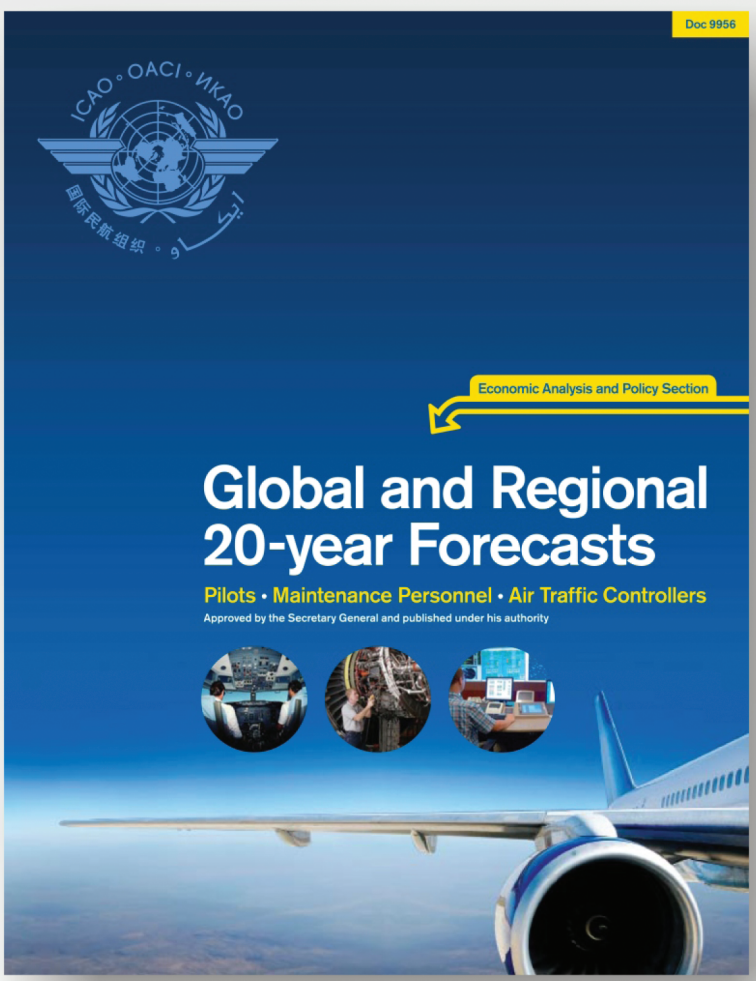

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Expanding MID RVSM Implementation

Air traffic growth in the MID Region has led to increased congestion in some areas and a demand from the aviation community for increased capacity and improved efficiency. The implementation of new Reduced Vertical Separation Minimum (RVSM) levels is an important part of the integrated package of efficiency solutions which ICAO is helping to establish to address airspace congestion and overall air transport safety levels in a complementary manner.

As Mohamed Smaoui, ICAO MID Regional Officer ANS/AIM reports, RVSM efforts have been ongoing for over a decade now and have made excellent overall Regional progress, though some localized challenges do persist.

Mohamed Smaoui is an Air Navigation Engineer. He began his civil aviation career with the Office de l'Aviation Civile et des Aéroports of Tunisia (OACA), where he was involved in a variety of studies and projects concerning ASM, ATS, CNS/ATM, AIS/MAP, PANS-OPS and related developments. He last served the OACA as Head of its Aeronautical Information and Telecommunications Services Department. Smaoui joined ICAO in December 2001 as Regional Officer, AIS/MAP, in the MID Regional Office. He presently serves as Regional Officer ANS/AIM, responsible for ongoing AIS/AIM activities in both the MID and EUR/NAT Regions. In addition to his AIS/AIM responsibilities, Smaoui oversaw ATM activities in the MID Office during 2005–2007 and is still in charge of RVSM and other monitoring issues in the MID Region as part of his role as Secretary of the MID-RMA Board. He has also been an approved ICAO ANS Auditor within the USOAP Programme since 2007.

The original request to investigate and evaluate the merits of RVSM implementation in the MID Region, with a view to reducing congestion in some areas and increasing overall Regional airspace capacity, was made by the participants to the Fifth Meeting of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG/5) as far back as 1998.

The MIDANPIRG/6 Meeting (Cairo, September 2000) next agreed to the establishment of a Middle East RVSM Task Force in order to carry out the necessary planning and coordination activities related to MID preparation for RVSM implementation. It was agreed by MIDANPIRG/6 that the target date for implementation should be 2003, and that the exact date would be determined once the planning process was more sufficiently advanced.

The RVSM Task Force was also mandated to identify the areas within the MID Region where it may not have been feasible to introduce RVSM during the initial implementation phases.

Additional progress and fine-tuning of RVSM implementation efforts next occurred when MIDANPIRG/7 (Cairo, 2002) directed Regional stakeholders to harmonize and coordinate local RVSM implementation timeframes with those adopted within the ICAO Asia-Pacific (APAC) Region, notably for those MID States south of the Himalayas. Related timeframes were then synchronized in this regard and related implementation was established in November 2003.

MIDANPIRG/7 also decided that the detailed safety analysis required for MID RVSM implementation should be carried out by the Middle East Central Monitoring Agency (MECMA), established under the auspices of the UAE General Civil Aviation Authority (GCAA) with its Head Office in Abu Dhabi.

The RVSM Implementation process in the MID Region was based on a sound methodology which culminated in the MID RVSM Pre-Implementation Safety Case (PISC). This was developed by the MECMA and demonstrated that safety objectives regarding established operational risk factors could be effectively satisfied through comprehensive evaluation and mitigation measures associated with Functional Hazard Assessments (FHAs). These latter measures were carried out in conjunction with ongoing development efforts relating to the continuing updating of MID National Safety Plans (NSP).

The RVSM PISC also demonstrated that the related Target Level of Safety (TLS) for technical risk (2.5 x 10^{-9} fatal accidents per aircraft flight hour) had been reflected in the

implementation plans established by MID States and stakeholders. Based on these conclusions, the MIDANPIRG/8 Meeting (Cairo, 2003) decided to proceed with MID RVSM implementation as of 27 November 2003, in the following FIRs: Amman, Bahrain, Beirut, Cairo, Damascus, Emirates, Jeddah, Kuwait, Muscat, Tehran and Sana'a.

Accordingly, RVSM was successfully implemented in the MID Region as of November 2003. This was accomplished with the full support of GCAA-UAE, which hosted the activities of the RVSM Task Force and supported the operation of the MECMA until June 2004.

With a view to fulfilling related ICAO requirements for a Regional programme to monitor the height–keeping performance of aircraft in the RVSM airspace (introduced by Amendment 43 to Annex 11 and applicable as of November 2005), the Middle East Regional Monitoring Agency (MIDRMA) was established in Bahrain, effective November 2005, in accordance with MIDANPIRG Conclusion 9/13.

MIDRMA Project

The ongoing activities of the MIDRMA are ensured through contributions from all MIDRMA Member States, in accordance with the MIDRMA funding mechanism agreed by MIDANPIRG.

A MIDRMA Board has been established for the overall supervision, direction, and management of the MIDRMA project. The Custodian Agreement between ICAO, the MIDRMA Board and Bahrain, signed by the ICAO Secretary General, the Undersecretary for Civil Aviation Affairs of Bahrain and the MIDRMA Board Chairman on behalf of the MIDRMA participating States, represents the legal basis prescribing the support functions that would be provided by ICAO in this regard.

The main duties and responsibilities of the MIDRMA are therefore as follows:

- To establish and maintain a central registry of State RVSM approvals of both operators and aircraft using the Middle East Region airspace where RVSM is applied.
- To monitor aircraft height-keeping performance and the occurrence of large height deviations and to report results accordingly.
- To monitor operator compliance with State approval requirements.
- To initiate necessary remedial actions if RVSM requirements are not met.
- To conduct safety analyses for RVSM operations in the MID Region and prepare RVSM Safety Monitoring Reports (SMR) as instructed by MIDANPIRG and the MIDRMA Board.
- To conduct readiness and safety assessments to aid decision-making in preparation for RVSM implementation in those FIRs where RVSM is not yet implemented.
- To carry out post-implementation safety assessments, as appropriate.

In accordance with these terms of reference, one of the main activities of the MIDRMA has been the development of safety analyses of RVSM operations and the preparation of RVSM SMRs.

The last MID RVSM SMR (SMR 2010) was approved by MIDANPIRG/12 in October 2010. It was noted with appreciation that all safety objectives had been met. The computed risk of collision due to technical height-keeping performance was 3.96×10^{-15}, which meets the ICAO technical TLS of 2.5×10^{-9} fatal accidents per flight hour and the estimated overall risk of collision was 6.92×10^{-12}, which in addition meets the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour.

Accordingly, it was concluded that MID RVSM operations are acceptably safe and that RVSM operations will not adversely affect the risk of en route mid-air collision.

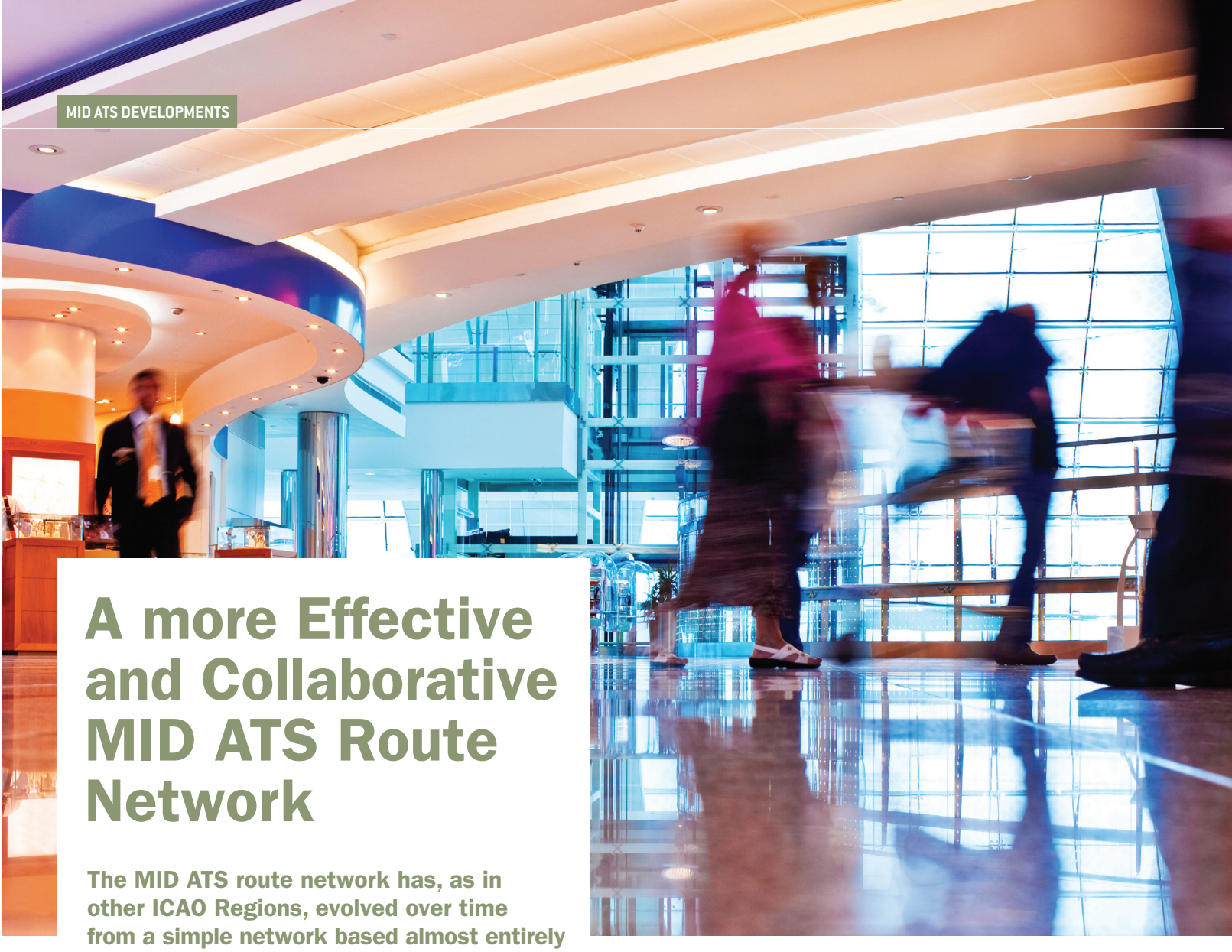
Outstanding RVSM Challenges: The Baghdad FIR

One of the remaining RVSM challenges for MID Regional stakeholders is the implementation of RVSM within the Baghdad FIR. With regard to the situation in Iraq, and taking into consideration the progress achieved there in recent years, the civil aviation community in the MID Region now considers RVSM implementation within the Baghdad FIR as a realizable priority that will increase Iraqi airspace capacity and reduce related stresses on neighbouring States.

MIDANPIRG/11 highlighted, however, that the provision of required ATC and CNS facilities and services in Iraq still represent one of the pre-requisites for RVSM implementation, and furthermore that the planning for RVSM implementation would also require the active participation of experts in airworthiness, flight operations, Air Traffic Management (ATM), safety assessments and height monitoring, etc.

Accordingly, MIDANPIRG/11 agreed to the establishment of a Working Group (BFRI WG) for the development of necessary planning materials related to RVSM implementation in the Baghdad FIR, and for assisting the Iraqi Civil Aviation Authority in expediting the implementation of this important project. MIDANPIRG/12 held in Amman, Jordan, in October 2010, was apprised of the outcome of the First meeting of this Working Group, which was held in January 2010. ■

MIDANPIRG/12 noted that conditions would be favourable for meeting the RVSM safety objectives associated with RVSM implementation in Baghdad FIR and urged all concerned parties to take necessary actions to support the implementation of RVSM within Baghdad FIR on 10 March 2011.



A more Effective and Collaborative MID ATS Route Network

The MID ATS route network has, as in other ICAO Regions, evolved over time from a simple network based almost entirely on terrestrial navigation aids to an increasingly complex system characterized by increasing use of on-board navigational capabilities and the Global Navigation Satellite System (GNSS).

As Saud Al-Adhoobi reports, the MID Region is now beginning to benefit from the comprehensive revision of its ATS network as part of ongoing Performance-based Navigation initiatives, resulting in greater leveraging of the Region's advanced aircraft fleet capabilities, more extensive civil/military co-operation and airspace optimization based on the Flexible Use of Airspace (FUA) concept, as well as additional improvements accruing from PBN's many efficiency and environmental benefits.

Saud Al-Adhoobi, an Omani National, joined DGCAM Oman in 1974 and worked as an air traffic controller from 1974 until 1987. From 1987–1992 he served as an ATC Supervisor and Examiner. Al-Adhoobi was attached to the Omani Air Space Management team as DMS Manager from 1992 until 2009, participating in the development and implementation of the very successful EMMARRSH project. He later acted as Project Leader on the redesign of ATS Route implementation for Yemen. Al-Adhoobi joined ICAO as Regional Officer ATM/SAR in October 2009.

In recent years, the rapid growth of air traffic originating, arriving and flowing through the MID Region has necessitated more assertive measures to avert congestion and alleviate the build up of high density areas to improve airspace efficiency. These actions have been particularly important with respect to the immense financial pressures that can impact air operators due to fuel costs, as was the case in 2008, not to mention the parallel and similarly urgent need to more

"The MID Region's adoption of PBN is also benefiting significantly from the increasing percentage of newer aircraft in the Regional fleet."

significantly address the environmental impact of air transport.

One of the measures adopted to address both efficiency- and safety-related issues has been ICAO's Reduced Vertical Separation Minima (RVSM), which the MID Region has implemented since 2003. During the implementation of RVSM, one of the strategic steps undertaken to ensure safety was the implementation of single direction ATS routes which, in certain cases, resulted in significantly different distances in reciprocating routes serving the same city pairs.

In consideration of the unsustainable efficiency burdens resulting from these disparities in the route pair distances, as well as the general impetus to reduce the negative environmental impact of air transport, the Tenth Meeting of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG/10, Doha, April 2007) called for a comprehensive revision of the MID ATS route network. This led to the subsequent establishment, in December 2007, of the ATS Route Network (ARN) Task Force.

The ARN Task Force presently faces two challenges that are particularly characteristic of the MID Region: the world's highest air traffic growth rate combined with what could arguably be described as the highest concentration of permanent special use (danger, restricted and prohibited) airspaces. Consequently, due to the fact that the task of completely revising and implementing a new ATS route network would take many years, the ARN Task Force has to consider ongoing measures to address immediate route network needs on a coordinated basis.

One highly enabling development in this regard was the adoption in 2007 by the 36th ICAO General Assembly of Resolution A36-23: Performance-based Navigation (PBN) Global Goals. This Resolution established a harmonized environment for the implementation of PBN—a key enabler of the broader ICAO Air Traffic Management (ATM) Operational Concept. It is expected that the new MID ATS route network will make extensive use of the PBN applications, not only to reduce route lengths, but also to facilitate the broader application of the Flexible Use of Airspace (FUA) concept with MID military stakeholders.

Among its many benefits, PBN allows for minimal lateral airspace use, the pairing of reciprocal routes through narrow airspaces occurring between special use airspaces (never before possible), and provides for the traversing of special use airspaces with minimal impact on their respective capacities.

In the midst of these ongoing challenges, the MID Region's adoption of PBN is also benefiting significantly from the increasing percentage of newer aircraft in the Regional fleet. These aircraft are equipped with the most recent avionics and navigation technologies, enabling them to participate more effectively in the PBN environment by taking advantage of GNSS functionalities and making more effective use of the PBN ATS routes that have been and are being established.

The first benefits of the transition to PBN have already been realized through the reduction in longitudinal separation along some ATS routes to 20 NM from 40 NM. In addition, to efficiently accommodate the increasing amount of Air Traffic, some States have implemented RNAV 1 Routes.

The MID Region has a significant amount of airspace set aside for special purpose use and which is therefore closed to international civil aviation. Recognizing that all airspace users have a legitimate right of access, ICAO has increased its efforts to enhance civil/military coordination and cooperation. The use of the flexible use of airspace (FUA) concept provides a means for international civil aviation to safely share airspace with all other legitimate users. To further ICAO's goals in this area, the MID Region, in May 2008, held a combined Search and Rescue (SAR) and Civil/Military Coordination Seminar which encouraged military participation to a degree never before seen.

A need was subsequently identified to hold similar seminars at regular intervals in the future within the MIDANPIRG framework, in order to maintain increased involvement of the military in civil and collaborative decision-making efforts. The ultimate goal is to more optimally share the limited civil and special use airspace in the MID Region using the FUA concept to safely increase the overall efficiency of the ATS route network. By doing so, all users will reap significant benefits.

With these efforts still ongoing, the ICAO MID Regional Office is now helping to establish a more efficient ATS route network; one able to sustain air traffic growth without significant operational restrictions while establishing, in parallel, more sustainable and more effective safety levels that will similarly continue to benefit MID aviation operators into the foreseeable future. ■

Greater Safety, Efficiency and Environmental Performance through PBN

The MID Performance-based Navigation (PBN) Regional Implementation Plan envisages pre- and post-implementation safety assessments and the continued availability of conventional air navigation procedures during the PBN transition period. It also reflects implementation concerns including traffic forecasts, aircraft fleet readiness, the adequacy of ground-based CNS infrastructure, etc.

As Raza Gulam, ICAO MID Regional Officer, CNS, reports, implementation targets for various categories of airspace for the short- (thru 2012) and medium-term (2011–2016) have been determined, and longer-term goals established to assist MID States, operators and Air Traffic Management (ATM) stakeholders as these exciting capabilities come on line to improve safety and efficiency in the MID Region.

Raza Gulam joined ICAO MID as Regional Officer, Communications Navigation and Surveillance, in May 2006. Prior to this posting he had participated in the design, implementation and operation of many Regional Aviation Telecommunication Networks and airport LAN and WAN and connections to airline hosts. The last position held while serving the Government was as an advisor to the Chairman of Civil Aviation. Gulam has also acted as project manager for the modernization of an AFTN Centre and participated in RADAR and VSAT implementations. During his tenure at ICAO, he has helped promote the implementation of MID Regional CNS plans, as well as developing MID Regional Strategies for ADS-B, GNSS and PBN implementations.

The Performance-based Navigation (PBN) concept specifies aircraft Area Navigation (RNAV) system performance requirements in terms of the accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular airspace concept supported by the appropriate navigation infrastructure. It is in this sense that the concept represents a shift from sensor-based to true performance-based navigation metrics.

The implementation of RVSM in the MID Region in November 2003 brought with it significant airspace and operational benefits. The realization of new benefits from RVSM, however, has presently reached a point of diminishing returns.

In view of the need for more detailed navigation planning, it was deemed advisable to prepare a PBN Roadmap to provide proper guidance to Air Navigation Service Providers (ANSPs), airspace operators and users, regulating agencies, and international organizations. Furthermore, the MID PBN Roadmap was envisaged as the basis for the development of a broader MID air navigation strategy, one which would prescribe precise Guidance regarding the implementation of air navigation infrastructure (SBAS, GBAS, etc.) and the development of related State planning.

ICAO's *PBN Manual* (Doc 9613) provides guidance on RNAV/RNP navigation specifications and encompasses two types of approvals: airworthiness (exclusively relating to the approval of aircraft) and operational. RNAV/RNP approval will be granted to operators that comply with these two types of approvals.

Upon implementation of PBN, the MID air navigation system would require monitoring in order to ensure that safety levels are maintained or improved in every case. A system safety assessment shall therefore be conducted during and after implementation.

MID PBN Planning

The Eleventh Meeting of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG/11, Cairo, February 2009) stipulated that PBN be implemented in a strategic manner in the MID Region. It accordingly established the MID PBN/GNSS Task Force which, *inter alia,* was required to follow up developments related to PBN and develop an implementation strategy.

The implementation of PBN in the MID Region will be incorporated into the *Regional Supplementary Procedures* (Doc 7030) as approved by the ICAO Council. MID States' PBN implementation plans are to include a concise and detailed schedule of implementation for all phases of flight, which will then be endorsed through Regional agreement processes and considered by the Council as requirements for incorporation into the Air Navigation Plan (ANP).

It is envisaged that for the short- and medium-term that the establishment of a backup navigation system (in case of GNSS failure) or the development of contingency procedures will be necessary.

En Route

Considering the traffic characteristics and CNS/ATM capability of the MID Region, associated en route operations fall into Oceanic, Remote Continental, Continental, and Local/domestic categories. In principle, each classification of en route operations should adopt, but not be limited to, a single RNAV or RNP navigation specification. This implementation strategy will be applied by the States and applicable international organizations as required, coordinated at the Regional level to ensure harmonization.

In areas where operational benefits can be achieved and appropriate CNS/ATM capability exists or can be provided for a more accurate navigation specification, States are encouraged to introduce the more accurate navigation specification on the basis of coordination with stakeholders and any affected neighbouring States.

Terminal

Terminal operations have their own characteristics, taking into account the applicable separation minima (aircraft/aircraft and aircraft/obstacles). They also involve the diversity of aircraft, including low-performance aircraft flying in lower airspace and conducting arrival and departure procedures on the same path or close to the paths of high-performance aircraft.

In this context, States have been encouraged to develop their own national plans for the implementation of PBN in TMAs, based on the MID PBN Regional Plan while avoiding the need for multiple operational approvals for intra- and inter-regional operations, as well as the applicable aircraft separation criteria.

Approaches

During the early PBN implementation phase, IFR approaches are to be designed to accommodate mixed-equipage (PBN and non-PBN) environments. Air Traffic Controller workloads are also to be taken into account while developing approach procedures. One possible way to accomplish this is to co-locate the Initial Approach Waypoint (IAW) for both PBN and conventional approaches. States should phase-out non-precision approach procedures at a certain point when deemed operationally suitable and taking into consideration GNSS integrity requirements.

Infrastructure Requirements

ICAO has endorsed the development and use of GNSS as a primary source of future navigation for civil aviation. ICAO noted the increased flight safety, route flexibility and operational efficiencies that could be realized from the move to space-based navigation.

GNSS supports both RNAV and RNP operations. Through the use of appropriate GNSS augmentations, GNSS navigation provides sufficient accuracy, integrity, availability and continuity to support en route, terminal area, and approach operations. Approval of RNP operations with appropriate certified avionics provides on-board performance monitoring and alerting capability enhancing the integrity of aircraft navigation.

GNSS augmentations include the Aircraft-Based Augmentation System (ABAS), the Satellite-Based Augmentation System (SBAS), and the Ground-Based Augmentation System (GBAS).

Other PBN Infrastructure

Other navigation infrastructure that supports PBN applications includes INS, VOR/DME, DME/DME, and DME/DME/IRU. These navigation infrastructures may satisfy the requirements of RNAV navigation specifications, but not those of RNP.

ICAO MID REGION PBN IMPLEMENTATION & HARMONIZATION STRATEGY

a. Implementation of any RNAV or RNP application shall be in compliance with ICAO *PBN Manual* (Doc 9613).
b. Implementation of RNAV5/RNAV1 depending on operation requirements for continental en route and local/domestic en route applications at least until 2016.

   Note: All current RNP-5 applications shall be redefined as RNAV-5 or RNAV-1 depending on operational needs.
c. Implementation of RNAV1/Basic-RNP-1 depending on operation requirements for terminal applications at least until 2016.
d. Implementation of RNAV-10 for oceanic/remote continental until at least 2016.
e. The use of RNAV 5/RNAV-1 specification by RNP specifications (e.g. advanced-RNP-1) for the use in the en route and terminal airspace to commence by 2016.
f. Implementation of approach procedures with vertical guidance (APV; Baro-VNAV and/or augmented GNSS), including LNAV-only minima, for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 percent by 2010; 70 percent by 2014.
g. Implementation of straight-in LNAV-only procedures, as an exception to f) above, for instrument runways at aerodromes where there is no local altimeter setting available and where there are no aircraft suitably equipped for APV operations with a maximum certificated take-off mass of 5,700Kg or more.
h. The use of NDB for approach operations shall be terminated not later than 2012.

INS may be used to support PBN en route operations with RNAV-10 and RNAV-5 navigation specifications. VOR/DME may be used to support PBN en route and STAR operations based on RNAV-5 navigation specification. Uses of DME/DME and DME/DME/IRU may support PBN en route and terminal area operations based on RNAV-5, and RNAV-1 navigation specifications. Validation of DME/DME coverage area and appropriate DME/DME geometry should be conducted to identify possible DME/DME gaps, including identification of critical DMEs, and to ensure proper DME/DME service coverage.

ICAO has stipulated that the conventional Navaid infrastructure should be maintained to support non-equipped aircraft during a transition period until at least 2016.

Surveillance Infrastructure

For RNAV operations, States should ensure that sufficient surveillance coverage is provided to assure the safety of the operations. Because of the on-board performance monitoring and alerting requirements for RNP operations, surveillance coverage may not be required. Details on the surveillance requirements for PBN implementation can be found in the ICAO *PBN Manual* and ICAO PANS-ATM (Doc 4444), and information on the current surveillance infrastructure in the MID can be found in ICAO FASID table.

Communication Infrastructure

Implementation of RNAV and RNP routes includes communication requirements. Details on the communication requirements for PBN implementation can be found in ICAO PANS-ATM (Doc 4444), ICAO *RCP Manual* (Doc 9869), and ICAO Annex 10. Information on the current communication infrastructure in the MID can also be found in ICAO FASID table.

Safety-related Concerns

To ensure that the introduction of PBN en route applications within the MID Region is undertaken in accordance with relevant ICAO safety provisions, any PBN implementation shall only take place following the conducting of a safety/risk assessment. Additionally, ongoing periodic safety reviews shall be undertaken where required in order to establish that operations continue to meet ICAO's target levels of safety.

To demonstrate that the system or system component is safe, it will be necessary that the implementing agency—a State or group of States—ensures assessments as detailed above. The implementing agency may have the capability to undertake such activities or may seek assistance from the Middle East Regional Monitoring Agency (MID-RMA) in this regard. The latter course of action is preferred, as the MID-RMA would be in a position to establish the necessary monitoring and data collection activity in a more effective manner.

The first benefits of the transition to PBN have already been realized. Besides the reduction in longitudinal separation along some ATS routes (to 20 NM from 40 NM), States such as the UAE have already implemented RNAV-1 Routes (it was the first MID State to do so in December 2008).

ICAO has developed pertinent points of contact in all States in order to effectively monitor implementation status, and its MID regional Implementation Plan was formalized by MIDANPIRG/11 and further refined by MIDANPIRG/12. ICAO also held a helpful PBN Procedures Design Course for Regional stakeholders in March 2009, and more recently a PBN Air Space Planning workshop was held in October 2010.

Fifty percent of MID States have now completed their PBN Implementation Plans. In addition, ICAO and IATA are providing assistance to States in the form of Go Team visits. ■

ICAO MID Short- and Mid-term PBN implementation targets

SHORT TERM (THRU 2012)	
Airspace	**Navigation specification**
En route – Oceanic	RNAV-10
En route – Remote continental	RNAV-10
En route – Continental	RNAV-5, RNAV-1
En route – Local/Domestic	RNAV-5, RNAV-1
TMA – Arrival	RNAV-1 in surveillance environment and with adequate navigation infrastructure. Basic RNP-1 in the non-surveillance environment.
TMA – Departure	RNAV-1 in surveillance environment and with adequate navigation infrastructure. Basic RNP-1 in non-surveillance environment.
Approach	RNP APCH with Baro-VNAV in all possible airports; RNP AR APCH in airports where there are obvious operational benefits.
Implementation Targets ■ RNP APCH (with Baro-VNAV) in 30 percent of instrument runways by 2010 and 50 percent by 2012 and priority should be given to airports with most significant operational benefits. ■ RNAV-1 SIDs/STARs for 30 percent of international airports by 2010 and 50 percent by 2012 and priority should be given to airports with RNP Approach.	

MEDIUM TERM (2013-2016)	
Airspace	Navigation Specification (preferred/acceptable)
En route – Oceanic	Nil
En route – Remote continental	Nil
En route – Continental	RNAV-1, RNAV-5
En route – Local / Domestic	RNAV-1, RNAV-5
En route – Local/Domestic	RNAV-1 or RNP-1 application
Approach	RNP APCH (with Baro-VNAV) and APV Expansion of RNP AR APCH where there are operational benefits. Introduction of landing capability using GNSS and its augmentations.
Implementation Targets ■ RNP APCH with Baro-VNAV or APV in 100 percent of instrument runways by 2016. ■ RNAV-1 or RNP-1 SID/STAR for 100 percent of international airports by 2016. ■ RNAV-1 or Basic RNP-1 SID/STAR at busy domestic airports where there are operational benefits. ■ Implementation additional RNAV/RNP routes.	

Driving the Transition from AIS to AIM

Despite the rapid progress of the Internet age, satellite navigation and computer networks, approaches to aeronautical information distribution based on paper charts, paper documentation and telex-based text messages still persist. Many of these systems still operate in isolation and are characterized by inefficient duplication of information and unreliable manual data entry, rather than expedited file transfer or database transactions.

As Mohamed Smaoui, ICAO MID Regional Officer ANS/AIM reports, although significant progress has been achieved in the implementation of the AIS/MAP services in the MID Region, the level of implementation of AIS automation and quality management by the MID AIS services remains a focus and concern for ICAO's broader safety and efficiency objectives.

The major task of an Aeronautical Information Service (AIS), as defined in Annex 15 to the Chicago Convention, is to ensure the flow of aeronautical information necessary for the safety, regularity and efficiency of international air navigation. Annex 15 describes the extent of information required and the means by which it should be made available in the form of an integrated Aeronautical Information Package (AIP), which consists of the following elements:

- Source AIP, including the relevant amendment service.
- Supplements to the AIP.
- Notices to Airmen (NOTAM) and Pre-flight Information Bulletins (PIBs).
- Aeronautical Information Circulars (AICs).
- Checklists and lists of valid NOTAM.

The situation today can best be described as a semi-automated process which requires significant manual intervention and remains wedded to the principle of a master paper reference document. This process has been maintained despite the fact that the information may, in many cases, also be maintained and transmitted electronically.

Each State publishes permanent aeronautical information in their AIP. The 'static' information in the AIP is consulted and then reference is made to any 'dynamic' variations to the normal situation during the relevant time period, as indicated in NOTAM and related Supplements. The use of the NOTAM format to distribute short-term changes to AIS information has served the industry well. The current format is not suited to full digital data exchange and processing, however.

While the NOTAM format enables some degree of filtering of information to suit individual requirements, the extraction of information from the AIP as a whole entails a considerable

amount of manual selection. Furthermore, the NOTAM cannot currently support the transmission of extensive digital and/or graphic information, due primarily to the limitations associated with communications technologies used in AIS (i.e. the Aeronautical Fixed Telecommunication Network (AFTN)).

Transitioning to AIM

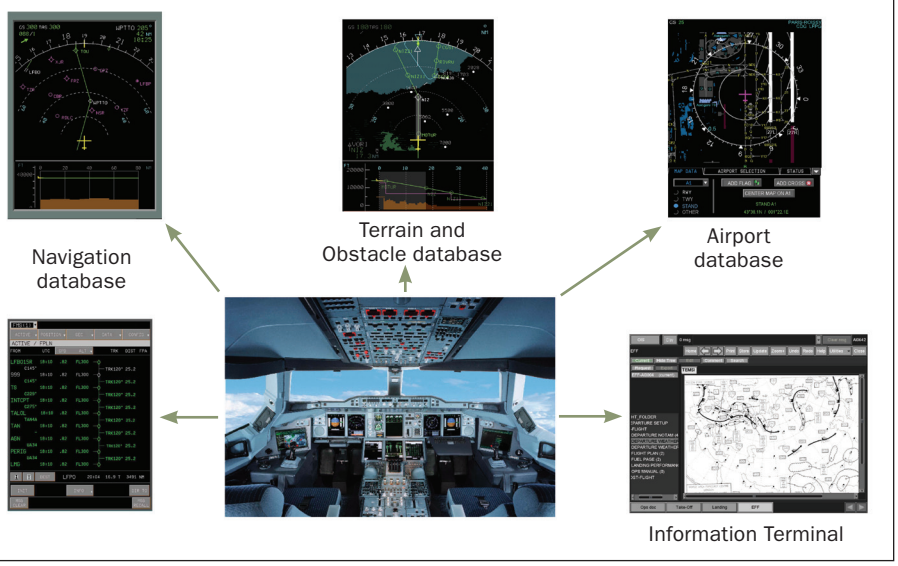
The Eleventh Air Navigation Conference (AN-Conf/11), held in Montreal in September 2003, endorsed ICAO's Air Traffic Management (ATM) Operational Concept and recognized that AIS would become one of the concept's most valuable and important enabling services.

As the 'Global ATM' system foreseen in the operational concept was based on a collaborative decision-making environment, the timely availability from authorized sources of high-quality electronic aeronautical, meteorological, airspace and flow management information became a basic requirement moving forward.

With a view to ensure the cohesion and linkages between the different components of the ATM operational concept, as well as to better formalize the role of AIS, the AN-Conf/11 recognized the need for the interchange and management of aeronautical information to be used by different services and users, while taking into account related interoperability concerns of existing and future systems.

Computer-based navigation systems, including Area Navigation (RNAV), Required Navigation Performance (RNP) and ATM requirements, introduced a need for new and corresponding AIS requirements relating to the quality and timeliness of information. The introduction of Performance-based Navigation (PBN) has already begun to realize airspace and procedure improvements and will continue to provide benefits to operators who have invested in PBN-capable aircraft.

Figure 1: Aircraft are important end users of aeronautical information



PBN is extremely data-dependent, requiring real-time aeronautical information of considerably higher quality than is yet available today. Accordingly, AIS would need to transform into more of an information management service, evolving its duties, responsibilities and scope to satisfy these new requirements.

Today, high-quality aeronautical information has become a prerequisite for the development of the new and interoperable tools that modern aircraft carry to improve their effectiveness in navigating safely and much more efficiently. These safety and efficiency benefits require the provision of more services to more aircraft in the same airspace at the same time.

Better aeronautical information is essential then if we are to achieve a fully integrated and interoperable Global ATM system which enables Air Navigation Service Providers (ANSPs) to safely handle more traffic in the same amount of space during the same amount of time. A more flexible ATM system of this nature will reduces costs and environmental impacts while improving access to congested airspace and remote airports in developing countries. It allows planners and decision makers to better direct the development of new tools and techniques based on accurate information which is available on time and where it is needed.

To satisfy new requirements arising from the Global ATM Operational Concept, AIS must transition to become data-centric rather than product-centric, a process which is being referred to as an industry-wide transition away from simple AIS and toward a more comprehensive form of Aeronautical Information Management, or AIM.

An ICAO Roadmap for the transition from AIS to AIM has been developed. It identifies the major milestones recommended for a uniform evolution across all ICAO Regions, identifies specific projects that need to be undertaken, and reflects the timelines for implementation.

The AIS/AIM Roadmap is intended to serve as a strategic positioning initiative to add impetus to the continuing improvement of AIS in terms of data quality, integrity and the definition of new services and products to better serve aeronautical users. The expectations are that the transition to AIM will not involve many changes in terms of the scope of information to

be distributed. The major change will be the increased emphasis on more effective data distribution.

The current SARPs in Annex 15—*Aeronautical Information Services*, are centred on products and do not provide specifications required for data exchange. A central element in the transition to AIM will be the standardization of the data elements in terms of field names, field types and field definitions. This will be provided in the form of a standard data dictionary for aeronautical information.

Furthermore, the definition of standard structured groupings of fields by features, attributes and associations is necessary. This will be provided in the form of a standard conceptual model for aeronautical information. Finally, the mechanisms to keep a dataset up-to-date across different components will need to be agreed. This will be provided in the form of a standard exchange model for aeronautical information where the access to individual datasets will be standardized.

During the complex transition to AIM, industry, regulators, manufacturers, service providers and other organizations will need to work together to achieve the best results.

AIS/AIM Activities in the MID Region

In the MID Region, the AIS/MAP Task Force and the ATM/SAR/AIS Sub Group are the main subsidiary bodies of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) addressing the planning and implementation issues related to the AIS/MAP field.

Although progress has been achieved in the implementation of AIS/MAP services in the MID Region, the level of implementation of AIS automation and quality management by MID States is still far below expectation. Accordingly, the MIDANPIRG/11 meeting held in Cairo in 2009 recognized that WGS-84, a reliable Quality Management System (QMS) and increased AIS automation represent very important pre-requisites for the ongoing MID Region transition from AIS to AIM. MIDANPIRG/11 also urged States that have not yet done so to give high priority to the implementation of existing Annex 15 SARPs, in particular those related to the aforementioned WGS-84, QMS and improved AIS automation.

Figure 2: Improve Predictability Through Better Information

Graphic taken from June 2005 NextGen Policy Briefing.

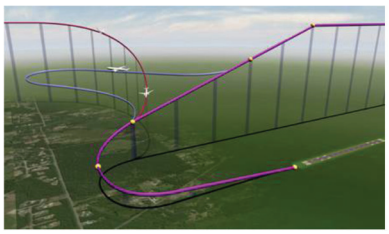
With a view to increasing the level of awareness of MID States regarding the current shortcomings of AIS and the necessity to transition to the interchange and management of aeronautical information in digital form, a MID AIM Seminar was successfully held in Cairo in October 2008.

The Seminar provided attending States with a better understanding of the planning and implementation issues related to the transition from AIS to AIM, and issued Recommendations which are guiding the ongoing work of the MID AIS/MAP Task Force which has been mandated by MIDANPIRG to develop performance goals for the transition from AIS to AIM in the MID Region and identify achievable milestones.

In achieving this objective, the AIS/MAP Task Force is closely following the outcome of the AIS-AIM Study Group established by the Air Navigation Commission in March 2008.
This Regional input will assist the ICAO Secretariat in the development of new AIM-related Standards and Recommended Practices (SARPs) and other guidance material, including the ICAO Roadmap for the transition from AIS to AIM. ■

Figure 3: Conventional Procedures

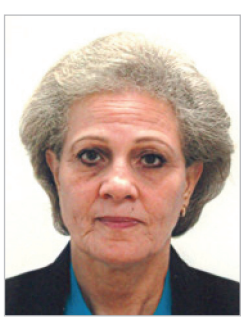
RNP Procedures
More efficient: improved safety, efficiency, and environmental effects. Extremely data-dependent requiring timely, quality assured Aeronautical Information.



Expanding MID Aerodrome Capacity Safely and Efficiently

Aerodromes are of significant economic importance, both on a local and global scale. Today's aerodromes in the Middle East are straining under the demands for increased capacity and high traffic throughput. The principal challenge for MID aerodrome operators will be to provide sufficient aerodrome capacity and efficiency without adversely affecting safety.

Failure is not an option in aviation and, in light of the continued downward pressure on costs across the sector, industry in the MID Region is striving to achieve ever-improving levels of safety in a rapidly expanding and fiercely competitive market. It also faces the complementary challenges associated with operating in increasingly congested aerodromes while endeavouring to realize greater operational efficiencies at every turn.



Nawal A. Abdel Hady is a civil engineer. She joined the ICAO Middle East Regional Office in February 2001 as the Regional Officer, Aerodrome and Ground Aids. Prior to that, she held the position of airport planning general manager with the Egyptian Civil Aviation Authority. In addition, she was also involved in the modernization of the air navigation services/system projects in Egypt. With more than 35 years serving civil aviation, Hady has broad experience in airport planning, design, construction, operations, maintenance and training on aerodrome infrastructure, facilities and services, as well as management of aerodrome developments aimed at increasing capacities and/or enhancing safety and efficiency of aerodrome operations. She is actively involved in the ICAO Universal Safety Oversight Audit Programme (USOAP) as an International Aerodrome Auditor.

Under strengthened regulations set by ICAO, Member States are now required to certify aerodromes used for international operations through an appropriate regulatory framework which reflects the specifications contained in Annex 14, Volume I to the *Convention on International Civil Aviation*.

As part of the certification process, States are obliged to develop an aerodrome manual which includes all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management—including a safety management system. This must be submitted by the applicant for approval/acceptance prior to the granting the aerodrome certificate. States are also required to promulgate information on the status of certification of their aerodromes in their Aeronautical Information Publication (AIP).

States are also required to oblige all certified aerodrome operators to implement Safety Management Systems as part of their State Safety Programme (SSP) and to oversee the performance of safety management for airport operators and relevant Air Navigation Service Providers (ANSPs). ICAO has

defined acceptable safety performance levels related to all of these activities and services as contained in Doc 9859—*Manual on Safety Management*. The intent of these specifications is to ensure the establishment of a comprehensive regulatory regime so that compliance with the specifications in Annex 14 can be effectively enforced.

It is recognized that the methods of ownership, operation and surveillance of aerodromes may differ among States. The most effective and transparent means of ensuring compliance with applicable specifications therefore is the availability of an arms-length safety oversight entity and a well-defined safety oversight mechanism with the support of appropriate legislation.

When an aerodrome is granted a certificate, it signifies to aircraft operators and other organizations operating there that, at the time of certification, the facility in question meets all the specifications regarding its operations. It also reflects that, in the opinion of the certifying authority, the facility is capable of maintaining these specifications for the period of validity of the certificate.

The certification process also establishes the baseline for continued monitoring of compliance with ICAO specifications.

Aerodrome Operations

Aerodrome operators/service providers are responsible for the safe, regular and efficient conduct of facility responsibilities and objectives in compliance with the applicable laws or regulations established by the State. As noted, these must conform to the ICAO Aerodrome Design and Operations' Standards and Recommended Practices (SARPs). This responsibility also falls to any contractors or sub-contractors that the facility service provider might employ.

The concept of an acceptable level of safety for aerodromes today responds to the need to complement prevailing approaches to regulatory-based safety management with a performance-based planning approach. Acceptable levels of safety express the general safety goals (or expectations) of an oversight authority that are aligned with the operator or service provider's specific safety performance. They are benchmarks to be strived for in the conducting of core business functions. In this manner, the oversight authority can measure safety performance against objective, transparent and State-sanctioned safety metrics.

It should be noted that the objectives of a State's safety oversight functions are to be managed through administrative controls (inspections, audits and surveys) carried out regularly by its Civil Aviation Authority (CAA).

Safety Risk Controls

All State Safety Programmes (SSPs) must establish clear safety risk controls reflecting ICAO's eight Critical Elements (CEs) of a State's safety oversight functions. The existence of a safety oversight function alone may verify that a State has a system of regulations, but it does not necessarily indicate that a safety risk analysis has been performed as a pre-requisite to the associated regulatory development. The simple existence of an oversight body similarly does not guarantee the effective monitoring of associated regulations with respect to their ability to serve as proper safety risk controls.

The State Regulations development under a State Safety Programme therefore must observe effective safety risk management principles, as follows:

a. Hazard identification.
b. Safety risk analysis.
c. Mitigation of hazard consequences.
d. Measurement of mitigation effectiveness and efficiency.

Based on information provided by MID States, MIDANPIRG/12 noted that status of implementation of SSPs and related implementations of SMS for aerodrome operations in the MID Region have progressed, however this implementation level is still below what is required and expected (approximately 50 percent of MID aerodromes will be certified before the end of 2010).

ICAO is considering the development of PANS/AGA (Procedures for Air Navigation Services relevant to Aerodrome and Ground Aids) as complementary to the implementation of the SARPs contained in Annex 14, Volume I for aerodrome operational management similar to PANS/OPS—Doc 8168 and PANS/ATM—Doc 4444. The new document is envisaged by 2013.

As part of its further efforts to assist States in the MID Region, ICAO conducted a Seminar on the Certification of Aerodromes and Safety of Aerodrome Operations in March 2010. The objective of the event was to increase awareness of State oversight obligations through the certification of aerodromes and the continuous monitoring of safety in aerodrome operations. ICAO is also planning a series of related SSP and SMS seminars.

The improvement of the quality and efficiency of aerodrome facilities and services, as well as the enhancement of the safety of aerodrome operations, are elements of Regional Performance Objectives (RPOs) that need to be harmonized with those now planned based on the Global and MID Regional Air Navigation Plans in support of ICAO's Strategic Objectives.

MIDANPIRG/12 agreed a set of key performance metrics, RPOs and other indicators that included improving aircraft operations through an increased number of certified aerodromes, as well as reducing the number of runway incursions and excursions per year in the MID Region. ■

Responding Effectively to Aerodrome Emergencies

An efficient response by airport emergency services can contribute significantly to the maintaining of related safety and operational objectives during crisis situations. The establishment of procedures for dealing with an accident in the vicinity of an airport is of primary importance as it is there that the greatest opportunities exist for saving lives.

As Nawal Abdel Hady reports, the development of a well-coordinated and comprehensive planning document, in addition to an effective training and testing regimen, are essential for responding effectively to emergencies at airports.

In the pre-jet age, problems arising from aircraft emergencies at airports involved a relatively small number of people and the requirements for emergency facilities were not nearly as demanding. Today, with the introduction of jet aircraft and particularly the New Larger Aeroplanes (NLAs) such as the Airbus A380, the number of passengers and crew involved has increased to more than 500 and as a result, it has become necessary to expand the requirements for emergency facilities.

New problems also have arisen with acts of unlawful interference against civil aviation. For all of these reasons the advance planning for emergency situations at an airport has become of major importance.

According to recent ICAO Safety and Security Statistics, the accident rate for scheduled air services (measured in passenger fatalities per 100 million Passenger-Kilometres Performed[1] (PKPs)) decreased marginally from approximately 0.01391 in 2007 to about 0.01370 in 2008. This was almost identical to the 2007 rate due to a slight increase in total PKPs of around 1.5 percent, and despite a 25 percent reduction in the number of passenger fatalities.

From 1990–2008 there was a significant decline in the accident rate, from around 19 accidents per 10 million departures in 1990 to around four per 10 million in 2008. There were 29 fatal accidents in 1990 compared to 11 in 2008.

For non-scheduled operations, there were 12 accidents in 2008 involving passenger fatalities for aircraft with a maximum take-off mass of more than 2250kg, compared with 14 in 2007. These accidents accounted for 80 passenger fatalities in 2008 compared with 86 in 2007. This improvement, to some extent, may be explained by: the superior reliability of turbo-jet aircraft; more sophisticated airborne equipment and navigational aids; the introduction of the new ATM operational concept and more sophisticated radar equipment; increased use of secondary surveillance radar and requirements for the Global Navigation Satellite System (GNSS).

Despite this noticeable progress, the aircraft accident is an ever present threat for which planning must continue.

Need for Airport Emergency Planning (AEP)

A high percentage of aircraft accidents occur during the take-off, landing or ground phases of air travel. Data reported to ICAO for the period 1980 to 2007 reveals that 7,641 accidents involving all types of air transport operations occurred on, or in the vicinity of, airports *(see Table 1 on page 22)*. Out of these accidents, 129,793 persons were at risk in these 7,641 accidents; 17, 168 occupants of the aircraft were fatally injured, while 112,625 survived. Out of these survivors, 4,116 were seriously injured.

According to Table 1, it is estimated that the average number of surviving casualties in an aircraft accident occurring on, or in the vicinity of, an airport is about 88 percent. The percentages for each of the aircraft's passenger capacity groups vary between 80 percent to almost 100 percent. The information is based on all accidents on or in a 10km radius of an aerodrome and representing all operational types.

Planning for Airport Emergencies

An efficient response by airport emergency services can contribute significantly to saving lives. Establishment of procedures for dealing with an accident occurring at, or in the immediate vicinity of, an airport is of primary importance because it is there that the greatest opportunities exist for saving lives.

Consequently, a well co-ordinated and comprehensive airport emergency plan

[1] PKPs represent the number of passengers multiplied by the number of kilometres travelled.

is essential, and yet experience has shown that quite often the procedures set forth in airport emergency plans are impractical during an actual emergency. Co-ordination among the various responding agencies can benefit greatly from emergency exercises.

Planning for airport emergencies is accomplished through the process of developing a set of instructions dealing with arrangements designed to meet emergency conditions, as well as taking steps to see that the provisions of the instructions are periodically tested. These instructions set out the specific duties of each agency or service concerned. The objective of this advanced work is to ensure a prompt and coordinated response of different airport agencies and available community agencies to minimize the effects of an emergency, particularly with respect to saving lives and maintaining aircraft/airport operations.

The development of a well-coordinated and comprehensive planning document is thus essential for dealing efficiently with an emergency at airport facilities. There are diverse emergencies for which the plan is required to be implemented, including those involving or not involving aircraft, medical-only emergencies, or a combination of these factors.

More specific examples of airport emergency types include: aircraft emergencies; sabotage (including bomb threats); unlawfully seized aircraft; dangerous goods occurrences; pandemic health crises; building fires; and natural disasters. For every emergency, each agency in turn is expected to ensure that its personnel are familiar with the functions, responsibilities and procedures outlined in the plan and that they receive proper training to accomplish the tasks required in a timely and coordinated manner.

Agencies/entities that might be involved in an aerodrome emergency include but are not limited to: air traffic services; Rescue and Fire Fighting (RFF) services; police and/or security services; airport authorities; medical services; aircraft operators; government authorities; airport tenants; harbour patrol and coast guard officials; transportation authorities; rescue coordination centres; civil defence/military; public information offices; and mental health agencies.

The mere establishment of airport emergency planning procedures, the provision of the required emergency equipment or supplies—particularly the Emergency Operating Centre—and the availability of adequate personnel to assure efficient performance of an airport emergency operational plan. Considerable effort is required in organizing, training and testing the procedures required before the appropriate authority can be satisfied that the airport emergency plan will be effective when an emergency occurs.

Effective intervention by RFF personnel, the availability of essential medical supplies, early attendance of first responders and law-enforcement officers, etc., are significant aspects which will be decisive in the successful enactment of any airport emergency plan.

Plan Implementation

The key factors required to achieve the utmost efficiency in emergency plan activation—those that will ensure the saving of lives and minimize both property damage and the disruption of aircraft operations—can be summarized in terms Co-ordination, Command and Communications categorizations.

Experience has shown that the procedures set forth in an airport emergency plan can often be found to be impractical during an actual emergency—resulting in confusion and inefficiency by the participants due to lack of co-ordination. Co-ordination among the various responding agencies has to be practiced through emergency drills.

Drills are considered as educational experience and are a valuable source of information and ideas. They help eliminate mistakes that would otherwise occur during a real emergency and greatly enhance the response and effectiveness of all agencies involved. Following each exercise, it is essential to conduct a critique or analysis of events so that deficiencies in the plan may be identified and eliminated.

ICAO-led Assistance to States

In view of the importance and complexity of the subject and to assist States in the implementation of the appropriate

Table 1: Aircraft accident survivors (1980–2007)

Aircraft occupants on board	Number of accidents	Total number of occupants	Total number of survivors	Percentage of survivors	Seriously injured
Less than 51	6,929	31,848	25,274	79.4	1,920
51 to 100	282	20,926	18,059	86.3	823
101 to 150	213	26,122	22,080	84.5	601
151 to 200	100	17,170	15,473	90.1	339
201 to 250	40	9,176	9,030	98.4	89
More than 250	77	24,551	22,709	92.5	344
All cases	**7,641**	**129,793**	**112,625**	**88.5**	**4,116**

International Standards and specifications, ICAO has produced Guidance materials on the subject of airport emergency planning in Doc. 9137—*Airport Services Manual*—Part 7—Airport Emergency Planning, in addition to other guidance materials, and published a newly updated edition of Part 5—*Manual on Removal of Disabled Aircraft*.

Through its various Regional Offices, ICAO has conducted a number of workshops on this subject in various countries. The objective of the workshops is always to upgrade the capability of airport management and operational personnel and to raise awareness of the importance of assessing its effectiveness on a regular basis so that they can cope more effectively with emergencies at their facilities.

An AEP Seminar was organized at the ICAO Middle East Regional Office, with the assistance of the ICAO Headquarters, in May 2008 in Cairo, Egypt. It was attended by a total of 50 participants from nine MID States, as well as five expert members from the Aerodromes Panel's RFF Working Group (RFFWG).

Speakers were selected to provide and share information, experience and best practices on aerodrome emergencies planning and testing. The target audience was staff from Civil Aviation Administrations (CAAs) and aerodrome operators, officials involved with AEP, RFF at the administrative and operational levels, representatives from the aircraft manufacturers and lastly international/regional organizations dealing with related matters.

The speakers were from ICAO HQ and the MID Regional Office, Lebanon (DGCA), Egypt (Cairo Int'l Airport Co.), Canada (Transport Canada), Singapore (CAA) and an AEP Consultant working for the New Dubai International Airport (UAE). Audio visual presentations and discussion papers on different AEP aspects, including case studies on real emergencies, were presented, and daily sessions for open discussions were held.

The participants to the Seminar had the opportunity to attend an AEP full scale-exercise conducted at Cairo International Airport in coordination with the Egyptian Civil Aviation Authority and Cairo International Airport Company. The purpose was to increase awareness and gain knowledge on how to assess and manage a full-scale AEP exercise including exchange of experiences in that field.

The Middle East Region Air Navigation Planning and Implementation Group Meeting (MIDANPIRG/12, Amman, Jordan, October 2010) invited MID States to participate in a survey on the status of implementation of ICAO requirements relevant to development and periodic assessment of aerodrome emergency plans in the MID Region. This was suggested with a view to enhancing the overall response effectiveness regarding aerodrome emergencies in the MID Region.

Health- and Disease-related Planning Requirements

As of July 2007, Annex 9 to the Chicago Convention requires all ICAO Member States to establish a national aviation plan in preparation for an outbreak of a communicable disease posing a public health risk or public health emergency of international concern. Guidance in developing a national aviation plan for medical- and disease-related concerns can be found on the Aviation Medicine page of the ICAO Web site at **www.icao.int/icao/en/med/medFAQ_en.html#health**.

ICAO's Web-based guidance provides references and links to the World Health Organization (WHO) Global Preparedness programme, other ICAO State guidelines, Airports Council International (ACI) guidelines and International Air Transport Association (IATA) recommended procedures.

In March 2009, the ICAO Council adopted Amendment 10 to Annex 14—Aerodromes, Volume I, Aerodrome Design and Operations, that includes provisions related to the inclusion of 'public health emergencies' that need to be considered by aerodrome authorities in the development of their applicable emergency plans. These provisions have been applicable as of 19 November 2009. Furthermore, ICAO will organize in coordination with the World Health Organization (WHO) a Workshop (Cairo, 8–10 February 2011) on the Cooperative Arrangement for the Prevention of Spread of Communicable Disease by Air Transport (CAPSCA). This event will highlight the role of State regulatory bodies, aerodrome operators, air traffic controllers, pilots, and health associations, as well as the importance of effective planning for health emergencies. ■

Resolving Origin-Destination Data Challenges

New Software Tool Effectively Manages Larger Aviation-related Databases

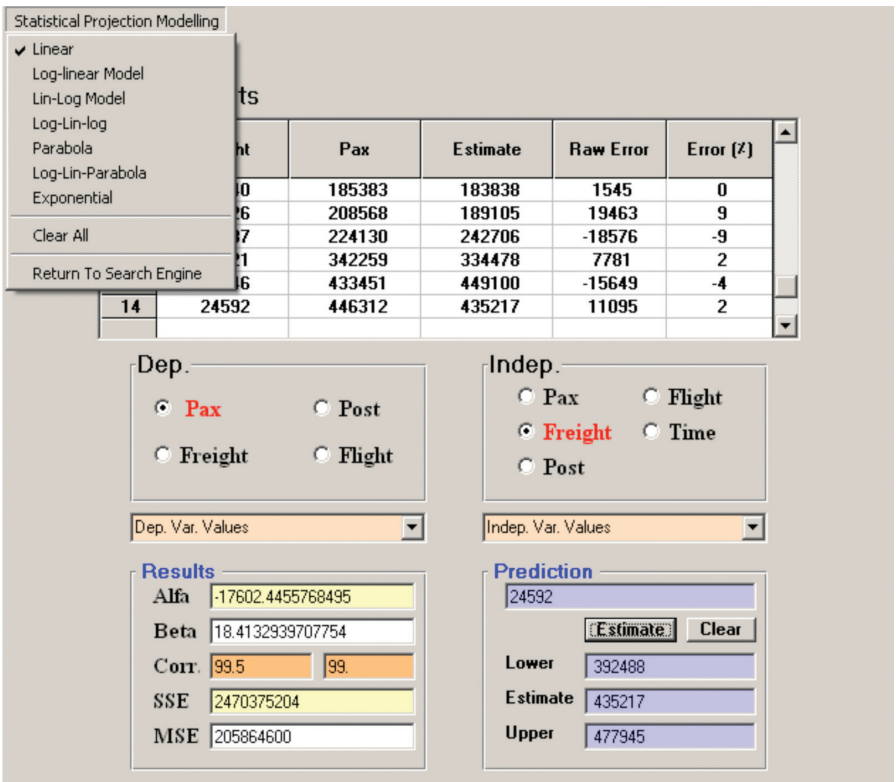
When dealing with large databases, the use of available statistical software tools can be fraught with difficulty regarding effective data analysis—in particular regression analysis. Solutions for larger databases require not simply new modules for, or new versions of, existing software products, but rather comprehensive new tools redesigned from the ground up to specifically handle the complexities associated with larger databases.

As Massoud Nakhkoob of the Civil Aviation Organization of Iran reports, one such innovative new software tool, ARTFOPLAS (short for Air Route Traffic Forecasting and Planning Software), has been proprietarily designed for the analysis of the particularly large aviation-related databases developed for origin-destination traffic data.

Massoud Nakhkoob is a senior researcher in statistical science and an experienced computer programmer with the Department of Information Technology and Statistical Surveys, Civil Aviation Organization of Iran. He has published articles and books in Iran on topics such as Flight Theory and Reliability Theory, and has designed and developed a number of sophisticated software packages, including Digital AIP, ARTFOPLAS, (Flight) Delay Analysis and Monitoring System (DAMS), CASIS, etc. Nakhkoob has also participated in the ICAO MID Forecasting Sub-group for several years now, where he has presented a number of discussion papers on traffic forecasting.

ARTFOPLAS has been developed based on the specifications found in ICAO Doc 8991—*Manual on Air Traffic Forecasting*. It is a database management system that can, among its other useful functions, provide a regression analysis of origin-destination traffic data (Digest of Statistics, On-Flight Origin and Destination) whether at the national or Regional level. The new software tool includes seven different statistical models for predicting traffic data, each capable of being fit to any selected data set extracted through the system's search engine.

Figure 1: The ARTFOPLAS regression analysis panel



ARTFOPLAS can currently manage single-variable models, however for subsequent releases it is expected that double-variable models (based on, for example, GDP and Yield) will also be developed, also in-line with requirements set-out in Doc 8991. For more information please contact mnakhkoob@yahoo.com.

ARTFOPLAS is supported by a large database of the origin-destination data through which data for any specific origin, destination and origin-destination can be extracted for soft return down statistical analysis. It operates on the basis of the following criteria:

Fixed origin only	Analysis provided for each individual destination
Fixed destination only	Analysis provided for each individual origin
Fixed origin and destination	Analysis provided for the selected route
Neither 'O' or 'D' fixed	Analysis provided for each origin and destination input

Applicable data extraction is performed via the powerful search engine panel of the software, enabling users to search for any selected air route and extract the corresponding data set.

After extracting the desired data set, users can quickly perform a basic evaluation of available data and a thorough statistical analysis of the extracted data with the system's comprehensive reporting system. This allows users to search for any desired origin and/or destination data based on the seven separate statistical reports, ARTFOPLAS provides a thorough analysis of the route's traffic data set.

The ARTFOPLAS seven on-board statistical reporting categories

1. Data Report
2. Origin Analysis
3. Destination Analysis
4. Route Growth (Origin Fix)
5. Route Growth (Destination Fix)
6. Route Share (Origin Fix)
7. Route Share (Destination Fix)

Currently, ARTFOPLAS covers the origin-destination traffic data for the MID Region only, which includes about 30,000 data points collected from the *Digest of Statistics, On-Flight Origin and Destination*. The database can, however, include data at a regional level and a national level for each individual State being studied. In this way, each State can also examine its origin-destination data and provide predictions for any desired air route data. In addition, the software can be easily utilized by airlines for planning air route passenger demand and other traffic data.

When users search for a particular origin, destination or origin-destination and extract its corresponding data, predictions can also be provided for any data items as well as access to the generated statistical reports.

For predicting purposes, after users have determined which of the seven ARTFOPLAS reporting models to utilize (through an examination of the model's R2 and model residuals), predictions can be prepared for the primarily selected origin, destination or origin-destination.

For example, if the route Dubai-London is selected, a good fitting can be provided with R2=0.99 *(see Figure 1)*, through which predictions of passenger traffic can be prepared. At the present time, the system's database supports a total of 132 origins/destinations, with at least one of these located in the Middle East. ■

GCAA

دولة الامارات العربية المتحدة
الهيئة العامة للطيران المدني
UAE General Civil Aviation Authority

United Arab Emirates

GCAA
دولة الامارات العربية المتحدة
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UAE General Civil Aviation Authority

Liberalization, Commitment and Cooperation:

Air Transport Progress in the UAE

In an exclusive interview for the ICAO MID Regional Report, H.E Saif Mohammed Al Suwaidi, Director General of the UAE General Civil Aviation Authority (GCAA), discusses how the UAE has been a Regional leader in recent years in helping to foster more open and cooperative approaches to MID Regional and sub-Regional air transport challenges.

ICAO *MID Regional Report*: What are the current areas that the UAE is concentrating on as it seeks to further modernize its air transport infrastructure and regulations?

H.E Saif Mohammed Al Suwaidi: The UAE already has one of the most modern air transport infrastructures in the world. It continues to make huge investments, both in air navigation systems and airport infrastructure, to better address and anticipate the tremendous growth of the air transport industry—both in our State specifically and the MID Region in general.

On the regulatory side, the UAE is undergoing a major revision of its primary civil aviation law, as well as its civil aviation regulations, with a view to enhancing the regulatory mandate of the GCAA to be more in-line with the latest global developments in this regard.

Examples that are presently ongoing in this respect include upcoming revisions to aircraft maintenance management stipulations, aircraft design certification standards, and flight crew licensing procedures.

What does the GCAA feel to be the most pressing concerns for the ICAO MID Region specifically over the next decade?

From an airspace management perspective the UAE's main concerns at present include the adoption of a standard separation of 10nm Region-wide, increased adoption and implementation of Performance-based Navigation (PBN) operational improvements (both en-route and in the terminal area), progress in the employment of the Flexible Use of Airspace (FUA) concept to enable reductions in military-related airspace restrictions, and lastly the implementation of an effective Air Traffic Flow Management (ATFM) framework.

How has ICAO served to assist and guide the GCAA as it manages the significant progress and success of its air transport system?

The UAE fully recognizes the importance of ICAO as a specialized United Nations agency, responsible for creating Standards and Recommended Practices (SARPs) that enable the safe and efficient growth of international civil aviation.

The GCAA not only fully applies and supports these international standards, but also a wide-range of related ICAO initiatives and programmes in areas that are critical for international air transport. In this regard our State hosts ICAO's MID COSCAP-related events, is a key sponsor of ICAO's Safety Road Map in the Region, leads Search and Rescue (SAR) sub-Regional initiatives in relevant MID and African States, and provides voluntary contributions to ICAO's environmental programme initiatives.

More importantly, the UAE is an active Member on the ICAO Council, a very important position that our country sees as a prime opportunity to represent the interests of fellow Arab States and to cooperate with different Regions in the world by sharing the UAE's knowledge, experience and resources for the benefit of least-developed and developing countries.

As an example of this latter commitment, the UAE has signed cooperation agreements with the Arab Civil Aviation Commission (ACAC), the African Civil Aviation Commission (AFCAC) as well as the Latin American Civil Aviation Commission (LACAC) to provide training, support and other expertise as needed in areas of mutual interest and to support cooperative air transport initiatives.

In your view, in what ways does air transport help to support economic growth and social development within the UAE and the MID Region?

The UAE's experience is a good example for any country in the world of the tremendous importance of an efficient and effective air transport network in providing much-needed support for economic growth and social development.

Dependable air transport services go hand-in-hand with the development of all tourism–related objectives, robust local and international trade, improved foreign and local investment opportunities, and lastly deeper cultural and political ties with countries around the world.

All these benefits are maximized within a State when its air carriers are given the freedom to maximize traffic rights, routes and flight frequency based on commercial viability. An important aspect of these liberalization benefits is that they do not carry any fiscal implications with respect to investment by local governments. It is purely a matter of political will and an openness to the principles of a truly open sky.

It is for this reason that the UAE strongly advocates for liberal or open skies agreements with many countries in the world. Our State already has 131 international transport agreements in place—48 of them establishing open skies and 38 supporting other forms of associated liberalization. ■

"The UAE's experience is a good example for any country in the world of the tremendous importance of an efficient and effective air transport network in providing much-needed support for economic growth and social development."

A New Benchmark for MID Air Traffic Control:

The UAE's Sheikh Zayed Centre

The General Civil Aviation Authority (GCAA) of the United Arab Emirates (UAE) launched a new Air Traffic Control Centre (ATCC) near Abu Dhabi International Airport in 2009 to provide for the safe and efficient handling of applicable air traffic until 2020.

The $81.7 million project has been one of the Emirates' most important infrastructure objectives and the resulting facility, officially known as the Sheikh Zayed Centre (SZC), is now the largest and most advanced air traffic management facility in the Middle East.

The SZC consists of two main buildings—the ATCC and the Emergency ATCC—each of which has been designed to satisfy a range of operational requirements.

The new SZC site also features four uniquely-designed, 60m communications towers, providing a blend of aesthetic quality with cutting-edge technology. These and the other infrastructure components on the site will benefit from no less than four levels of redundant power supply to ensure constant electrical current for the main Air Traffic Control (ATC) equipment.

The main SZC ATCC building has a 600m^2 ATC room with sector suites featuring the latest technology—projected to accommodate traffic growth requirements for the next 20 years or a total traffic volume exceeding 2 million annual movements (latest air traffic data recorded 580,118 movements in 2009).

The SZC's componentry includes ARTAS and AMHS ATM display systems from Comsoft, while integrated voice communication is supplied by Park Air Systems and the Micro Nav ATC simulator, being installed in the Emergency ACC. The SZC will have a total of 76 workstations handling live ACC, military liaison and emergency/training requirements. This represents a tripling of current capacity.

The new ATM system permits flexible sectorization in order to task individual air traffic controllers in the safest and most efficient manner and with the assistance of modern ATC tools such as arrival and stack managers and medium-term conflict detection—to optimize traffic handling.

Voice communication will be fully digital, from microphone to antenna, and will connect externally through IP VPN with several layers of redundancy to ensure maximum availability.

The UAE GCAA is quickly becoming a Regional pioneer in areas such as the integration of ADS-B surveillance through the ARTAS tracker. This was operational as of the facility's opening. The UAE is also pursuing the design and operational implementation of newer and more environmentally progressive RNAV-1 routes, both for en route and in-terminal environments.

Together, these combined modernization programmes provided by the SZC will serve to alleviate traffic congestion, minimize delays, shorten routes and create the capacity necessary for sustained growth in air traffic necessary for the economic well-being of the UAE and the Region. ■

2011 ICAO MID CALENDAR OF EVENTS*

Meetings	Site	Duration
State Safety Program (SSP) Implementation Training Course	Cairo	17–20 January
Joint ICAO/WHO Workshop on the Cooperative Arrangement for the Prevention of Spread of Communicable Disease by Air Transport (CAPSCA)	Cairo	22–24 February
ATN/IPS WG/1	Cairo	14–16 March
DGCA-MID/1 Meeting	Abu Dhabi	22–24 March
Surveillance Workshop	Cairo	18–20 April
MIDRMA Board/11	Damascus	26–28 April
Traffic Forecasting (TF) SG/4	Cairo	9–11 May
ARN TF/4	Jordan	16–18 May
MID OPMET Bulletin Management Group (BMG)/1	Cairo	23 May
SADIS OPSG/16	Cairo	22–24 May
MET SG/3	Cairo	24–26 May
AIS/MAP TF/6	Bahrain	6–8 June
ICAO New Flight Plan Format Study Group (INFPL) SG*/3	Abu Dhabi	13–15 June
SMS Training Course	Cairo	19–23 June
ICARD & eANP Workshop	Cairo	27–29 June
European Co- ordination Centre for Aviation Incident Reporting Systems (ECCAIRS)	Cairo	10–14 July
CNS SG/4	Cairo	17–19 July
Secondary Surveillance Radar (SSR) Code Allocation Study Group (SSRCA SG/4)	Cairo	14–15 September
Regional Aviation Safety Group-Middle East (RASG-MID/1)	Cairo	18–21 September
PBN/GNSS TF/4	Cairo	2–4 October
MIDANPIRG Steering Group (MSG/3)	Tehran	17–19 October
ATM/SAR/AIS SG/12	Cairo	21–24 November
MID Regional Runway Safety Workshop	Cairo	28 Nov–1 Dec
Aerodrome Certification Implementation Task Force (ADCI TF/1)	Cairo	4–6 December

* Some of these events, dates and locations are subject to additional confirmations. For the most up-to-date listing of confirmed ICAO MID events, please consult the Regional Office Web site at **www.icao.int/MID/meetings**

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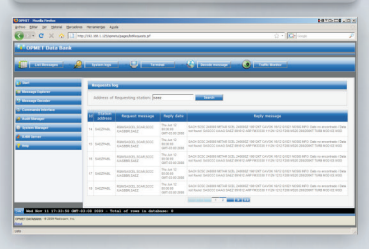
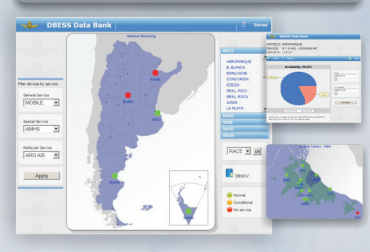
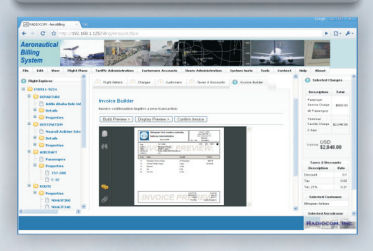


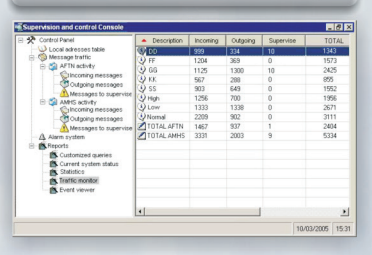
DBESS Data Bank Equipments, Systems & Services Data Bank



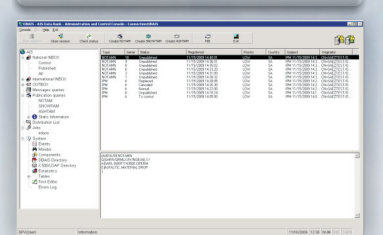
AeroBilling Airport Services Billing



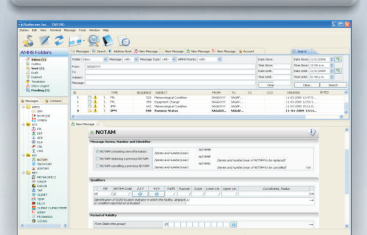
ComGate AFTN/AMHS Gateway



DBAIS AIS Data Bank



AMHS User Agent



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