FUTURE VISION:
Sharing airport data

DANIEL CALLEJA:
Lessons learned from SES

GLOBAL BENCHMARKING
First results released

PLUS: US halves runway incursions, Italy leads Mediterranean partnership, Schiphol tests green approaches, Russia modernises ATM, Middle East challenges, and leading news and comment from the world of ATM.

BOEING

Perhaps it's Time to Look at the Skies in a Different Way.

Air traffic demand will more than double in the near future, which makes the need for a new Air Traffic Management system more critical than ever. The time to act is now. At Boeing, we're already working with aviation leaders around the world to create a network enabled system that is higher capacity, safer, more secure and far more efficient.

Pilots, controllers, airlines and security personnel will exploit precise information made available through an integrated network to make rapid decisions with high-performance results. It's the kind of solution you expect from a leader in network-centric operations. It's the kind of solution you expect from Boeing.

CONTENTS

DIRECTOR GENERAL'S NOTE

ATC Global 2011 already!? It hardly seems five minutes have passed since the last annual ATM industry feeding frenzy in Amsterdam. Well here we are again, one year on, and time to reflect on the achievements of the past year. Last year, I said that ANSPs seem to be in the 'naughty corner' of the air transport industry, and unhappily this remains the case today. Why?

Six days of airspace closure due to a volcano and a regulatory regime caught on the hop. An increasing occurrence of ATC industrial action, from wildcat and illegal walk outs, to service interruptions of one kind or another almost from one end of Europe to the other. This all as a consequence of industrial or political unrest. Traffic still below 2007 levels and yet ATC delays increased!

Hardly a stand out year for progress… and yet, so much has been achieved by ANSPs. The Single European Sky has marched ever closer. But do you notice how all the good work gets lost in the bad headlines? We have work to do as an industry.

We need to communicate our good news, we need to solve our regulatory shortcomings. And we need to turn the page on use of Industrial action as a tool for negotiation in our monopoly service based industry, vital to the air transport industry, that in turn is vital to our global society.

While ANSPs generally do a very good job of providing a safe and efficient service, our industry counterparts still blame us for increased costs, emissions, and delays. Of course, there is always more to be done, and the good news is that through CANSO, ANSPs are stepping up.

We also now have a society that finally recognises (after Eyjafjallajökull) that air transport is a vital part of our world. There are lessons to be learned without doubt.

As this issue of Airspace goes to print, we are putting together the final details of this year's CEO Conference and an EGM. This meeting will mark a major milestone for CANSO as we present the Waypoint Strategy to Members for their final approval.

Waypoint 2013 expands CANSO's focus from representing its Members as the Global Voice of ATM, to taking an active role in the transformation of Global ATM Performance. This has been the most comprehensive strategic review undertaken by CANSO in its 15-year history, and it couldn't have happened at a more appropriate time.

For further progress to be made though, we need a level playing field of knowledge and understanding. We need to work together, we need to bring our staff on the journey, and we need to take responsibility for delivering what society expects from our industry. We also need to be clear what we need from our regulators in order to do this.

The time to act is now.

Graham Lake

ATM ✈ NEWS

ASIA LEADS PASSENGER GROWTH FORECASTS

According to IATA, an additional 800 million air travellers will see passenger numbers rise to 3.3 billion by 2014, up from 2.5 billion in 2009. Nearly half the increase will be on Asia Pacific routes, in particular China. The US will remain the largest single country market with 671 million domestic and 215 international passengers (compared with 181 million and 33 million in China). The increase represents a compound annual growth rate of 5.9 per cent. The IATA industry forecast released in mid-February predicts international aviation will handle 38 million tones of air cargo by 2014, up 12.5 million tonnes from the 26 million tones carried in 2009.

Figures released by the US Federal Aviation Administration in February 2011 also predict continued growth over the coming years. US airlines will carry over a billion passengers by 2021, two year's earlier than last year's prediction, compared with just over 700 million in 2010. A 3.5 per cent increase in 2011 will be followed by 2.8 per cent annual increase over the coming decade, while by 2030, US passenger traffic will have reached 1.3 billion. US Secretary of Transportation Ray LaHood said: "Innovative NextGen technology will help meet the demands of the future by getting passengers to their destinations safely and more quickly." Supporting the US NextGen modernisation programme, The President's budget request proposals for fiscal year 2012 includes USD1.24 billion funding for the NextGen initiative. This is a 43 per cent increase over 2010 levels. The budget request includes USD285 million for the ADS-B system, a network of more than 800 ground transceivers that is due to be completed in 2013. It also includes US200 million assigned to accelerate applied research for NextGen, and USD26 million to improve GPS-based precision approaches and departures at airports across the country.

Asia Pacific routes will account for almost half the 800 million new travellers forecast in 2014.

Meanwhile Eurocontrol released a new forecast predicting growth rates of between 1.6 per cent and 3.9 per cent over the next 20 years. Growth will be faster in the early years and strongest in Eastern Europe. Growth will however be limited by airport capacity: Between 0.7 and 5 million flights will be unaccommodated in 2030, representing between 5 and 19 per cent of the demand airport capacity according to Eurocontrol. Aviation in Europe pulled out of the economic downturn and began to climb again in 2010. The total number of flights in Europe in 2010 was 9.49 million, an increase of 0.8 per cent compared to 2009.

COMMON STANDARDS HIGH ON THE AGENDA

In preparation for the 12th ICAO Air Navigation Conference (ANConf/12) in November 2012, the EC, SESAR Joint Undertaking, Eurocontrol and European Aviation Safety Agency have started a coordination group to consolidate the European position on interoperability. The aim of the group is to define clear messages and to drive developments proactively in order to prepare a strong input on interoperability with standardisation bodies such as EUROCAE and finally ICAO. The group will work in coordination with the US counterparts.

TOWARDS A SINGLE AFRICAN SKY

The Agency for the Safety of Air Navigation in Africa and in Madagascar (ASECNA) held the third meeting of the ANSPs of the African region in Cotonou, Benin at the end of 2010. Following previous sessions in Dakar (2002) and Johannesburg (2004), this meeting set out to revitalise pooling strategies to achieve the vision of the ANSPs in the region of a single African sky. Among the topics discussed were economic and institutional aspects, emerging technologies in ATM and how to create an effective and seamless airspace. Among the speakers at the conference were Benoit Fonck, SJU Programme Execution & Risk Manager – Deputy Chief Programme and representatives of SESAR members Thales, Eurocontrol and Indra. Benoit Fonck presented the SESAR Programme with the objective of sharing the SJU's experience as technological and operational dimension of the Single European Sky initiative.

⚲ CANSO news

CANSO WELCOMES NEW MEMBERS

CANSO welcomed four new members in the first quarter of 2011. The Air Navigation and Weather Services CAA (ANWS) of Taiwan is the newest full member to join the industry association. ANWS CAA is responsible for the operation and quality of air traffic services systems in Taipei FIR. With 780 staff, its activities include the provision of flight information, air traffic control, aeronautical telecommunication, and aeronautical meteorological services The organisation also installs, operates and maintains airways navigational facilities to ensure the safety of airspace users. In the Middle East, the Abu Dhabi Department of Transport (DoT) became a new associate member. DoT activity covers four key focus areas: aviation, maritime, public transport, and highways and infrastructure. The Aviation Division is responsible for coordinating with the General Civil Aviation Authority (GCAA) on regulation, overseeing the strategic planning efforts of the Abu Dhabi Airports Company (ADAC), and monitoring, evaluating and reporting on aviation performance. The DoT also works in close collaboration with major stakeholders such as Emirates Airways and the Abu Dhabi Tourism Authority.

Two industry suppliers also joined as associate members. Research and Production Corporation Lianozovo Electromechanical Plant (LEMZ R&P Corp) is a joint stock company based in Moscow that specialises in developing and manufacturing radar complexes and control systems. Second new member, Austrian company Avibit Data Processing GmbH, specialises in the design, development and integration of intelligent software solutions that drive safe and efficient of ATC operations.

⚲ ATM news

CALLS FOR BETTER AIRCRAFT TRACKING

Improving the monitoring and position tracking of aircraft while in remote or oceanic areas is the aim of the Oceanic Position Tracking Improvement & Monitoring (OPTIMI) project. The consortium responsible for the project delivered a report to the SESAR JU in January 2011 following a series of in-flight demonstrations involving commercial flights in three different Atlantic oceanic regions (North Atlantic, Europe and Africa).

The report makes recommendations in four main areas. In the area of technology, the report recommends the equipage and use of Future Air Navigation System products (FANS 1/A) for oceanic area control centres and aircraft flying over oceanic areas; this will cover in particular ADS-C and Controller Pilot Data Link Communications (CPDLC).

In the area of procedures, the report recommends aircraft position reports should be automatically transmitted every 15 minutes with additional automatic transmission of position when a deviation from the planned route is detected. In the economic area, the report recommends optimising the cost of the communications for ATC purposes in the oceanic areas along the service provision chain. Finally in policy and regulation, the report recommends rescue and area control centres to jointly develop protocols for notifications and interventions in emergency situations. The consortium recommended also to further develop the technologies and procedures for the downloading of aircraft safety critical data to the ground on an event-triggered basis, together with the possibility of creating a Central Repository to manage this information.

CANSO ISSUES UAE DECLARATION

CANSO's Middle East CEO Coordination Committee (MEC3) issued a UAE Declaration following a high level meeting in January 2011 to undertake a joint Middle East airspace study. Committee members aim to develop a coordinated approach to optimising the region's airspace structure. The declaration recognises the role aviation plays in the economic prosperity of the Middle East and beyond, while drawing attention to the importance of addressing air transport capacity challenges. The high level meeting attracted leaders from many of the region's aviation stakeholders including ANSPs, CAAs, airlines, airports and the military. Industry bodies such as AACO, IATA, ICAO and JATCA also took part. Speaking from the CANSO Middle East Conference in Abu Dhabi, CANSO Director General Graham Lake said: "The Joint Middle East airspace study represents a further step toward improving operational efficiency, and safeguarding the economic well-being of the region. It builds on the valuable work already undertaken by ICAO and ANSPs by taking a collaborative regional approach to measuring performance, identifying areas for improvement, and developing solutions to address the Middle East's capacity challenges."

Airspace capacity is an emerging issue in the region as current constraints limit capacity and force inefficient routings. The route structure does not currently make use of the advanced navigation capability of modern airline fleets. In addition, civil and military airspace sharing agreements are needed to better balance airspace distribution. Adding urgency to the situation is the fact that Middle Eastern countries plan to spend an estimated USD200 billion on new aircraft in the next 15 years and some USD100 billion in infrastructure to meet demand.

CANSO's third Middle East conference was held in Abu Dhabi in January 2011.

Daniel Calleja
Lessons from the Single European Sky

Daniel Calleja, recently appointed Deputy Director General of DG Enterprise, European Commission, looks back over his six-year tenure as Director of Air Transport for DG MOVE and comments on priority actions needed to create Europe's single sky.

Has the Single Sky second package (SES II) brought Europe closer to its goals? What targets are in place and how will they be enforced?

The second SES package is about creating a better performing and more sustainable single sky for Europe. This is being achieved through a holistic approach based on the five key pillars of aviation:

- Safety with the extension of EASA competences to ATM and airports, allowing it to be in charge of all the elements of the safety chain, which is in itself a defragmentation and a safety improvement.
- Performance through the adoption of a set of regulations putting in place a performance scheme with binding targets associated with incentive mechanisms; establishing Functional Airspace Blocks and Network Management Functions as de-fragmentation and performance tools.
- Technology with the transition from development to the deployment of SESAR.
- The gate-to-gate dimension materialised with the integration of airport operations in the single sky process. This is a priority issue for the year 2011.
- The human dimension, through a systematic reinforcement of staff consultation at local and European level and the creation of a group of experts involving ANSP and staff association representatives to monitor the implementation of SES.

An important element for the success of the SES II initiative is a coordinated implementation of all these pillars. With the expected adoption in February 2011 of the Network Management Functions Implementing Rule and the nomination of Eurocontrol as the Network Manager, we are about to be successful: All tools will be in place for the SES II to start delivering benefits in 2012.

The performance targets contained in the national performance plans that will be adopted in the course of 2011 shall be binding on the member states and their ANSPs. In particular, the cost-efficiency target will be achieved through the application of the risk sharing mechanism contained in the amended charging regulation. This puts an end to the paradigm of automatic full-cost recovery that has prevailed for four decades. The capacity and environment targets shall be reached through good coordination between member states, FABs and the Network Manager, under close monitoring by the Commission who will propose corrective measures if it detects persistent performance decline.

Safety is now fully in the hands of EASA, which is a completely independent entity.

Are you confident that realistic performance measures are in place, and they will be adhered to?

The EU-wide performance targets that received a positive opinion from the Single Sky Committee on 3 December 2010 are the result of a long and meticulous expert work carried out by the Performance Review Body (PRB) in consultation with all stakeholders. The initial PRB proposals were refined as a result of intense and candid discussions between member states assisted by their ANSPs, the PRB and the Commission. As a result, the EU-wide targets proposed for the Single Sky Committee's opinion received a unanimous support from member states, both at expert and political level. We expect to see them materialise in the national or FAB performance plans that will be delivered by end-June 2011.

Why not tie performance to metrics that the consumers understand?

We needed to start our performance scheme with metrics that are understood, accepted and applicable by the professionals. As a result the key performance indicators that we have selected may not always be directly meaningful for the citizens, but our citizens understand very well that ultimately these indicators will lead to reduced delays, fewer tons of fuel and less emissions of carbon dioxide. We are already starting work with a view to refining our metrics for the second reference period that will start in 2015.

Will EASA take on the role of a single regulatory body for all European ATC?

SES II is about defragmentation and efficiency gains. Fragmentation is also in itself a safety issue. We plan to achieve defragmentation of both service provision and regulatory functions first through the implementation of meaningful and ambitious Functional Airspace Blocks. We encourage member states to "think FAB" and organise their regulatory and oversight functions accordingly, in the same way as ANSPs are encouraged to generate synergies and merge functions in a FAB environment. The sole rule-maker will be the Commission, assisted by EASA in relevant ATM safety issues and by Eurocontrol as SES Network Manager, and support to regulation in other matters. The Commission shall carefully monitor implementation.

How will the SES move from research phase to deployment?

The implementation of the ATM Master Plan is already being deployed through Implementation Phase I (IP1). The industry asked the Commission to chair a multi-stakeholder Steering Group created to monitor this deployment. This is very important for the entry into operation of technology which is key to enable the deployment of SESAR (IP2 and IP3). The European Commission will address the issue in the coming weeks with the EU member states in the Single Sky Committee, involving industry representatives.

Lessons will be drawn from this experience in order to establish a Commission proposal on the governance and financing of SESAR deployment, due to be presented to the EU Council and the European Parliament before the end of 2011. This proposal will build on the outcome of a wide impact assessment study, now ongoing. The study includes the establishment of a SESAR deployment task force whose members are Eurocontrol, EASA, the SESAR JU and the Commission. The task force is supported by a group of experts drawn from industry (ANSPs, airlines, airports) and military stakeholders.

What are the main challenges to achieving the safety, capacity and efficiency targets set by SES?

With all the SES II tools nearly in place, the obvious priority for the coming months and years will be to deliver real benefits to the industry and the European citizens. The SES II package is largely based on bottom-up approaches (for the FABs, for the performance plans, and even for some Network Management Functions). The Commission expects that member states, ANSPs and airports will take the measure of the challenge and implement the actions and changes, which may be structural, necessary to achieve the high level societal goals of the Single Sky. We are just slowly recovering from a very severe crisis, which in a way gives the impression that the targets are more difficult to reach than they should. On the other hand, crises are often good catalysts for structural changes. I am confident that together we shall be able to deliver.

''I want the airports to be fully integrated in the SES package, including the performance scheme''

Is SES moving in harmony with other modernisation programmes?

There is currently only one modernisation initiative that equals our level of ambition: the US NextGen programme. From the outset, discussions have taken place between Europe and the US to ensure the necessary level of interoperability between SESAR and NextGen while providing new opportunities for industry to cross-fertilise between the two

programmes. This is about to materialise through the signature of a Memorandum of Cooperation (MoC) between the EU and the US on research and development activity for civil aviation on the occasion of the Aviation Summit in Budapest on 3-4 March, 2011. This MoC includes an annex on SESAR-NextGen interoperability which provides the framework for fruitful technical cooperation between the SESAR JU and the US FAA, as well as a coordinated approach and support to ICAO's standardisation efforts in ensuring worldwide interoperability for the new generation of ATM systems.

In parallel to our close relation with the USA, it is important to establish and maintain relations with the other regions of the world as most of them are also moving forward with a view to renewing their ATM systems within the next 10 to 15 years. Regional or national programmes such as CARATS in Japan are widely inspired by SESAR and NextGen and share the same high level objectives. I support the SESAR JU initiatives to listen to such specific needs and requirements and explain how SESAR-derived technologies and procedures can deliver them, as this could result into new market opportunities for the European industry.

Given a clean sheet of paper, would you go about SES in the same way?

Our industry evolves at a very fast pace and needs to react very quickly to events. We started SES II before being hit by a severe economic crisis and going through the volcanic ash cloud and winter disturbances. If we were launching the SES II initiative now, I think that the European Commission itself would need to be even more ambitious in its proposals in order to trigger faster and more radical and structural changes in the way we provide air navigation services. There is no alternative to delivering the SES.

At a more pragmatic level, we also need to fully integrate the airport dimension in the global package as from the first performance reference period. This is something that will be our priority in the coming months and years. I want the

airports to be fully integrated in the SES package, including the performance scheme, as from the second reference period that will start in 2015. Work on an airport package has already started within the Commission services.

Overall I am proud of the commitment shown by all Member States, the military community, all industry stakeholders, the SESAR JU, EASA and Eurocontrol to ensure a process of change in the ATM field.

What lessons do you think we can learn from the SES process?

I would like to stress two lessons: one for the European Commission, and one for the aviation community.

For the European Commission: The ATM domain is extremely complex, involving a lot of different stakeholders with sometimes diverging interests, different cultures and different business models, with an overarching safety dimension, involving security and defence requirements and constraints, and essentially based on the human factor. Nothing is possible without the active involvement and commitment of professional staff. Looking back, I am happy to see that we quickly took the measure of the complexity of the domain. We had the wisdom to listen to the different actors, take their needs seriously, and give them the role they asked for to create a single European sky in a spirit of partnership and cooperation.

For the European aviation community: The European aviation community is highly professional. Our aviation industry is a world leader, and we have many of the best scientists and engineers in the world. Our industry has built outstanding and sophisticated systems in times where money was not an issue. The problem is that sometimes we tend to forget that we cannot live in isolation and we should always bear in mind that our main objective is to ensure the safe and performing mobility of people and goods, for the overall benefit of our economy and for the well-being of our citizens. We should always make the effort of taking a step back from time to time to have a look at the 'big picture', not only to be reassured of the importance of our role, but mainly to remind ourselves that our mission is to provide a safe, efficient and affordable transport system. I have had the privilege of working with an exceptional group of highly committed and professional colleagues during this period, which I shall never forget. Thank you very much.

Runway Safety
Hank Krakowski, Chief Operating Officer, FAA ATO

The world's deadliest aviation accident occurred not in the air, but on the ground. In 1977 two jumbo jets collided on a runway in the Canary Islands, killing 583 passengers and crew. More than 30 years later, "runway safety continues to be one of aviation's greatest challenges," according to the International Civil Aviation Organization (ICAO) 2010 High Level Safety Conference.

Runway safety is a top priority at the Federal Aviation Administration (FAA) and significant progress has been made over the last decade in reducing the number of serious runway incursions at US airports. In fiscal year 2010 there were just six major runway incursions compared with 12 such incidents the previous year and 67 in 2000. The FAA's goal is zero serious incursions and we are working hard to meet this goal.

The sheer numbers of flights and the need for ground vehicles and people to operate near or on runways results in lots of opportunities for runway incursions, and no single regulation, procedure or technology will eliminate them. The solution is developing and managing runway safety programmes that actively involve everyone. Air navigation service providers must work collaboratively with the airline industry and other operators, pilots, airport managers, maintenance technicians and airport vehicle operators so we can design and implement a mix of effective ways to reduce or eliminate runway incursions.

These responses may include new technology but also involve enhancing situational awareness, developing safer and more efficient revised procedures, providing better outreach to pilots, and improving airport signage and runway markings.

Human factors and precise communications play an important part in preventing runway incursions, and the adoption of ICAO phraseology is part of the FAA's effort to harmonise its procedures with international standards. The FAA conducted a safety analysis which determined that the ICAO phraseology "line up and wait" should replace "position and hold" to eliminate confusion on the runway, particularly among pilots who fly to other countries. In response to this recommendation, FAA's air traffic controllers last year began using the new terminology when instructing pilots to enter a runway and await takeoff clearance. To ensure full compliance and ensure safety, the FAA conducted an extensive publicity effort to educate pilots about the new terminology prior to its implementation.

The adoption of ICAO phraseology is part of the FAA's effort to harmonise its procedures with international standards. It follows our decision several years ago to use ICAO's definition of runway incursions. Some lower-risk incidents that the FAA previously had classified as surface incidents are now treated as Category C or D incursions.

In addition to the "line up and wait" ICAO-compliant phraseology change, the FAA also implemented a revised safety-enhancing procedure that requires controllers to issue explicit clearances each time an aircraft or vehicle on a taxiway wants to cross a runway. For pilots, the FAA publicised the enhanced taxiway and holdline markings that are now in use at more than 600 airports.

A crucial element in enhancing runway safety is the collaborative work of Runway Safety Action Teams both at the regional level and at every US airport with an operational air traffic control tower. Air traffic managers work with airport managers and a wide range of stakeholders and airport surfaces users – from pilots to vehicle drivers – to identify and mitigate potential safety hazards. Beginning in 2011, the FAA is requiring each local tower team to meet at least once a year, rather than every other year, and some teams meet quarterly or even monthly. The regional and local teams develop Runway Safety Action Plans that address site-specific issues and document best practices that can be shared with the aviation community.

Newly installed Runway Status Lights at Dallas Fort Worth successfully completed a 90-day test period in the last quarter of 2010. Similar warning lights are being installed at 23 large airports.

As part of its transformative Next Generation Air Transportation System, the FAA has installed Airport Surface Detection Equipment-Model X (ASDE-X) at 33 airports and will add the final two, for a total of 35, this year. ASDE-X collects and fuses data from a variety of sources, including surface movement radar, multilateration sensors, Automatic Dependent Surveillance-Broadcast (ADS-B) sensors, the terminal air traffic automation system and aircraft transponders to present an accurate display of movements on and near the runway. Safety logic in the system's automation provides conflict alerts to controllers allowing for timely intervention in potentially serious events.

In addition, the FAA has been demonstrating at three airports an ADS-B "In" application called Surface Indications and Alerts (SURF IA) that provides enhanced situational awareness and direct alerting in the cockpit. We intend to provide initial operating capability between 2012 and 2015 for the SURF IA application to give pilots traffic and runway status information and caution and warning alerts.

Surface safety is also being enhanced through the use of Runway Status Lights. Information from approach and ground surveillance systems like ASDE-X is used to automatically turn on and off status lights embedded in the airfield pavement. When the red lights are illuminated, pilots cannot continue without clearance from air traffic control. Test systems have been installed at San Diego, Los Angeles, Dallas-Fort Worth and Boston. The system completed a successful 90-day testing period last fall, and Runway Status Lights are to be installed at 23 large US airports beginning this year.

Smaller airports will also benefit from new technology. The FAA is evaluating the Low Cost Ground Surveillance system, which uses commercially available radar to provide ASDE-X-like capabilities. This provides better runway surveillance that is especially valuable during periods of low visibility.

The FAA is pleased to collaborate with our international partners on a variety of activities that promote runway safety awareness, such as the International Runway Safety Summit that we held in December 2009 and the upcoming ICAO Global Runway Safety Symposium scheduled for May 2011. Through CANSO and other venues, we will continue to work together to achieve harmonised improvements that underscore our shared commitment to providing the safest air service possible, on the ground as well as in the air. ✈
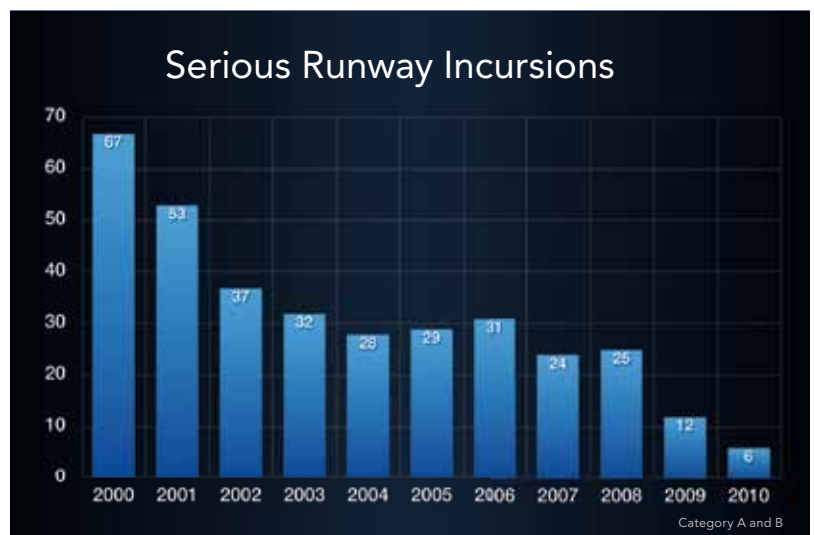
Global Performance Report

CANSO results highlight wide variation in ANSP performance

In 2010, CANSO broke new ground with the publication of the first global air navigation services report. The first to be approved for public release, the report shows a commitment to improve performance and desire for transparency among CANSO members.

Up to 30 ANSPs contributed data covering the period 2005-2009 in the following key performance areas:
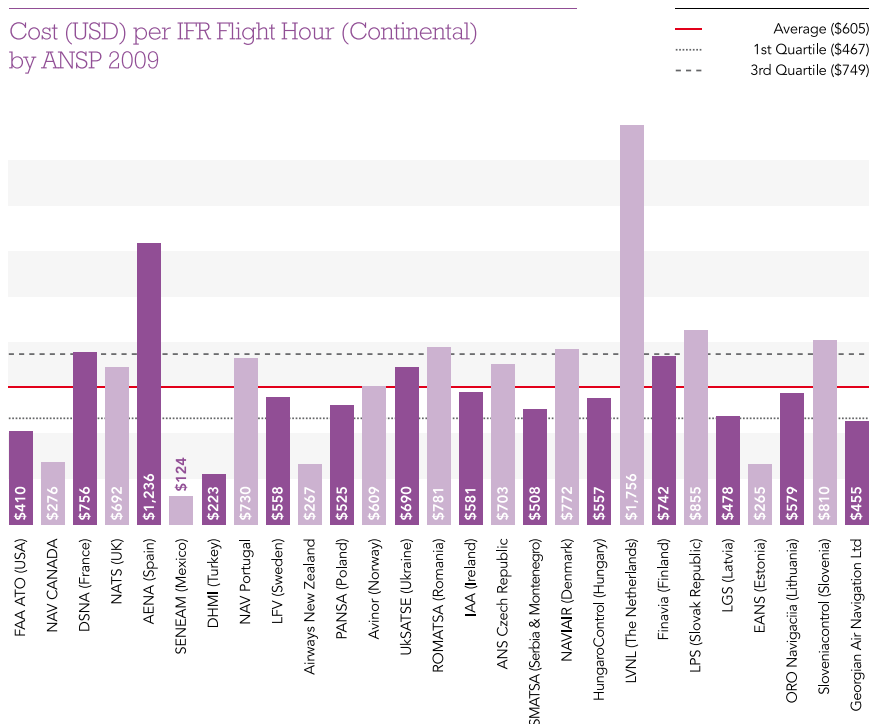
• Productivity – comparing flight hours per ATCO in operations
• Cost-effectiveness – comparing in particular employment cost of operational ATCOs per flight hour of service delivered
• Price – price charged for ANS service
• Revenue – ANS revenue
• Profitability – return on equity and return on investment.

The report allows ANSPs to compare and contrast their own results with their peers at a global level. CANSO's aim is for all its ANSP members to participate in the report, and also to add indicators for safety, operations and the environment in the future.

The performance results included in the 2010 report cover each of the years from 2005 to 2009 inclusive, plus a cumulative overview for the five-year period as a whole. Preliminary figures for 2010 indicate that 2009 was the bottom of the current downturn. However, as traffic starts to grow again, ANSPs will have to balance containing costs against increasing staff training and the installation and commissioning of new technology to handle that growth. Maintaining current service charges will be a significant challenge. In 2009, controlled traffic was down 7.5 per cent, and revenue fell an average of 4.3 per cent compared with 2008. Against this backdrop, overall costs increased by 1.9 per cent.

A total of 29 ANSPs provided productivity data for 2009. In terms

Cost (USD) per IFR Flight Hour (Continental) by ANSP 2009

Average ($605)
1st Quartile ($467)
3rd Quartile ($749)

FAA ATO (USA) $410; NAV CANADA $276; DSNA (France) $756; NATS (UK) $692; AENA (Spain) $1,236; SENEAM (Mexico) $124; DHMI (Turkey) $223; NAV Portugal $730; LFV (Sweden) $558; Airways New Zealand $267; PANSA (Poland) $525; Avinor (Norway) $609; UkSATSE (Ukraine) $690; ROMATSA (Romania) $781; IAA (Ireland) $581; ANS Czech Republic $703; SMATSA (Serbia & Montenegro) $508; NAVIAIR (Denmark) $772; HungaroControl (Hungary) $557; LVNL (The Netherlands) $1,756; Finavia (Finland) $742; LPS (Slovak Republic) $855; LGS (Latvia) $478; EANS (Estonia) $265; ORO Navigacija (Lithuania) $579; Sloveniacontrol (Slovenia) $810; Georgian Air Navigation Ltd $455

ANSP costs vary according to traffic volume and density as well as corporate structure and legal environment.

of IFR flight hours per ATCO in continental operations the average was 904, with 15 of the 29 ANSPs achieving a higher level of productivity than the average. The US FAA, Nav Canada, the Airports Authority of India, and Mexico's SENEAM reported the highest levels of productivity, while UKSATSE (Ukraine) and Georgian Air Navigation Ltd, reported the lowest.

The range is wide, starting at 296 IFR flight hours and rising to 1,804, with half of the ANSPs falling between 689 to 1,144, a difference of 66 per cent. Underlying factors impacting ATCO productivity may include labour laws, vacation/leave schedules, working hours per ATCO in operations, economies of scale, the ANSPs' ability to schedule to meet demand, and the differences between terminal and en route operations.

In terms of cost effectiveness, the 27 ANSPs that provided data reported an average cost (in USD) per Continental IFR flight hour of USD605, with costs showing a range from USD124 to USD1,756 with half falling between USD467 and USD749. Of the 13 ANSPs above the average, LVNL (The Netherlands) reported the highest costs at USD1,756 per Continental IFR flight hour (reflecting the operating cost in this airspace and the impact of the Maastricht Upper Area Control centre (MUAC) airspace located above it), followed by Spain at USD1,236. SENEAM (Mexico) and DHMI (Turkey) reported the lowest costs at USD124 and USD223, respectively.

ANS is a fixed-infrastructure business, and operating costs are typically high and fixed, with labour accounting for up to 70 per cent. So there is little flexibility for adapting to changing operating

conditions. During the volcanic ash crisis, for example, CANSO members reported losing 25 million Euros every day due to the absence of traffic, but were unable to reduce fixed costs accordingly. Productivity declines when traffic falls, but the number of ATCOs on duty remains the same.

For safety reasons, an ANSP cannot go 'bust' – the service must still be provided – so any losses incurred ultimately have to be recovered from airlines, the travelling public, or the taxpayer.
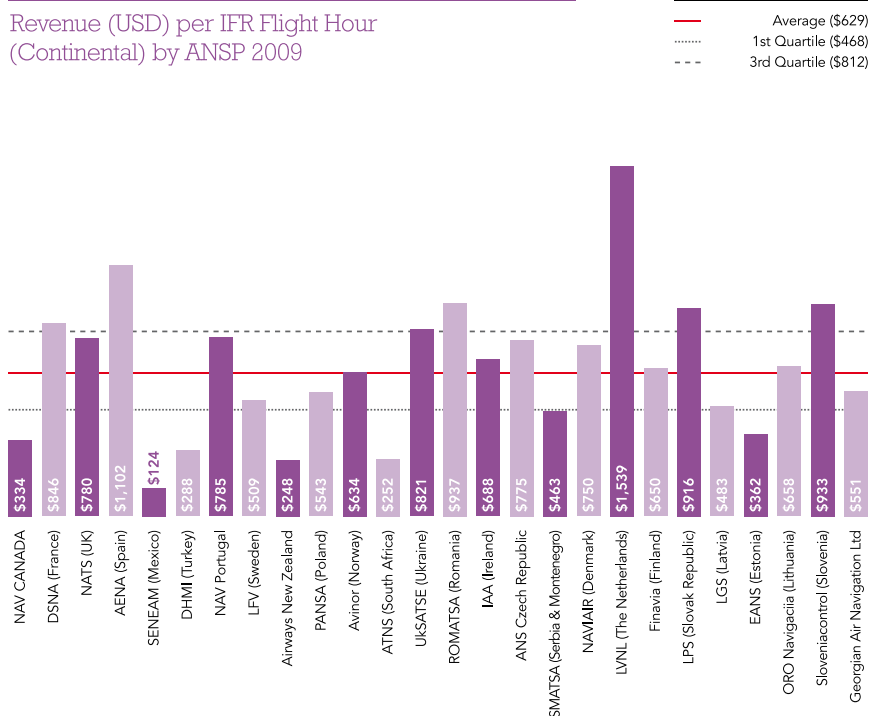
In terms of Revenue for 2009, a total of 26 ANSPs reported ANS Revenue (in USD) per Continental IFR flight hour, with a range from USD124 to USD1,539, with an average of USD629. Half of the participating ANSPs reported results between USD468 and USD812.

LVNL (The Netherlands) recorded the highest ANS revenue per Continental IFR flight hour by a significant margin at USD1,539, with Spain next at USD1,102. The lowest ANS revenue per Continental IFR flight hour was reported by SENEAM (Mexico) at USD124 and Airways New Zealand at USD248.

For the five-year period (2005-2009) as a whole, 25 members provided at least three years of productivity data in IFR flight fours per ATCO in Operations (Continental). Figures show that 11 ANSPs recorded improvements, with the largest increase in average annual change reported by SMATSA (Serbia & Montenegro) at 11.8 per cent and the biggest falls reported by Airports Authority of India (10.9 per cent) and South Africa (6.9 per cent).

Just two out of 23 ANSPs recorded an average annual fall in their cost (USD) per IFR flight hour (Continental) over the five year period. DFS (Germany) reported a drop of 3.3 per cent, with Nav Portugal showing a 1.0 per cent decrease. The highest average annual increases for the five year period were reported by LGS (Latvia) and HungaroControl at 20.1 per cent and 18.2 per cent, respectively.

Revenue (USD) per IFR Flight Hour (Continental) by ANSP 2009

Legend: Average ($629); 1st Quartile ($468); 3rd Quartile ($812)

ANSP	Value
NAV CANADA	$334
DSNA (France)	$846
NATS (UK)	$780
AENA (Spain)	$1,102
SENEAM (Mexico)	$124
DHMI (Turkey)	$288
NAV Portugal	$785
LFV (Sweden)	$509
Airways New Zealand	$248
PANSA (Poland)	$543
Avinor (Norway)	$634
ATNS (South Africa)	$252
UkSATSE (Ukraine)	$821
ROMATSA (Romania)	$937
IAA (Ireland)	$688
ANS Czech Republic	$775
SMATSA (Serbia & Montenegro)	$463
NAVIAIR (Denmark)	$750
LVNL (The Netherlands)	$1,539
Finavia (Finland)	$650
LPS (Slovak Republic)	$916
LGS (Latvia)	$483
EANS (Estonia)	$362
ORO Navigacia (Lithuania)	$658
Sloveniacontrol (Slovenia)	$933
Georgian Air Navigation Ltd	$551

Traffic downturn contributed to falling revenue in 2009.

In terms of revenue, 22 ANSPs provided at least three years of data over the five-year period, allowing calculations of the average annual change in their ANS Revenue (USD) per IFR flight hour (Continental). Of these, all but eight reported an increase, with NATS up the highest at 9.4 per cent followed by LPS (Slovakia) at 7.9 per cent. The greatest average annual decrease in revenue was recorded by DFS (4.2 per cent) and Poland (4.1 per cent).

ATM is a safety and infrastructure business with long planning lead times. Fixed operating costs cannot be easily adapted to changing conditions, for example the volcanic ash crisis cost CANSO members EUR25 million every day due to the absence of traffic but inability to reduced fixed costs. ANSPs can seek to delay capital expenditure, but to do so means the ANSP is not well-equipped to handled any subsequent upturn when it does occur.

The report encourages ANSPs to look for comparable ANSPs with which to benchmark themselves, for example with similar traffic volume, density and type of aircraft, with similar size of airspace, legal environments and corporate structure. From here, ANSPs can begin bilateral or multilateral studies and discussions to understand where their operations are comparable and examine the results. The benchmarking work deliberately focuses on core ANS delivery service as this is the operation that all ANSPs have in common.

The report demonstrates that CANSO has reached a point where it is able to show the world its success points, and acknowledges where there is still room for improvement. The willingness to share both good and bad news stories with customers and partners demonstrates a clear commitment to continuous performance improvement. The report has been released to stimulate open, constructive debate among industry participants. ✈

Single European Sky
Massimo Garbini,
ENAV Director General

ENAV provides air traffic control and training services for Italy's Ministry of Economy and Finance under the supervision of the Ministry of Infrastructures and Transport.

ANSPs need to be more competitive and efficient. How is ENAV addressing this?

ENAV operates according to a performance driven model and supports the Single European Sky (SES) II emphasis on performance. We believe that the quality of service is the key element in achieving enduring benefits in a competitive environment and that a balanced approach and priority setting is essential for an effective and successful strategy. Our objective is to provide the best service to the customer.

What are the main investment programmes underway?

Taking into consideration the growing attention towards performance, ENAV has invested into strategic technological enablers whose implementation will dramatically improve ATM services.
ENAV investment plans have been aligned to achieve the ATM capability level envisaged by the so called Implementation Package 1 (IP1), which constitutes the basis of tomorrow's European ATM system. Our main investment programmes are:

• 4-Flight (the new generation ATC common system)
• Coflight (the new generation flight data processing system)
• Mode S
• ADS-B

• Link IT (the programme for data-link implementation)
• E-NET (Italian ground network integrated to PENS)

How is ENAV contributing to SESAR?

ENAV participation in SESAR Joint Undertaking (SJU) research activities entails a significant effort in terms of human resources and technologies. ENAV participates in 85 projects (out of 310), with a leadership role in 15 of these. In addition, ENAV leads Work Package 3 which addresses the evolution and verification of validation and verification platforms.

As a member of the SJU, ENAV is committed to delivering a successful outcome to the SESAR initiative. The SESAR programme is an opportunity for ENAV, its affiliates and sub-contractors. ENAV is involved in many projects whose final aim is the validation of new technologies to improve performance and services, at the same time as meeting the SJU demand to shorten the gap between research and development and implementation.

How can Europe move from research to implementation?

European ATM faces an important challenge. All the effort spent in the design of the new target concept and related research activities will result in a new modernised ATM infrastructure

able to respond to the expected increase of capacity demand through a safe, secure, cost-efficient and environmental friendly solution. The deployment of SESAR needs to be correctly addressed; there is a urgent need for a governance structure, with the appropriate level of participation by major stakeholders in charge of the deployment in the decision making process who are able to manage the different activities envisaged within SESAR deployment phase. This is needed to implement a robust, timely-delivered and synchronised deployment process at European level.

Where is ENAV collaborating with neighbouring ANSPs?

In 2007 ENAV started a close cooperation with other ANSPs participating in the SJU membership. The partners share the same objective of ensuring the SESAR programme is operationally driven and addresses the challenge of a new generation ATM system. The spirit of partnership, created through close cooperation within the SESAR programme, has promoted co-operation and coordination between ANSPs as major SES actors. ANSPs are well paced to support the development of international harmonisation, and are indeed determined to take responsibility and ownership at European level, in order to achieve SES outcomes and maximise the benefits to users in the European network and the overall community.

What efforts are underway to harmonise ATS in the Mediterranean region?

The SES regulatory framework has, as a relevant milestone, the implementation of Functional Airspace Blocks (FABs) by the EU member states. One of the most significant FABs at European level, strategically set over the central/south-eastern part of the Mediterranean basin, is the BLUE MED FAB project, promoted and coordinated by ENAV and including Cyprus, Greece and Malta, as well as the non-EU member States of Albania, Tunisia and Egypt. Lebanon and Hashemite Kingdom of Jordan are observers.

In the first part of the ongoing "Definition Phase" of the project more than 154 proposals of route network improvements have been implemented, these are listed in the BLUE MED Route Network Catalogue delivered to the route network development sub-group of Eurocontrol in February 2010. Moreover, a number of further improvements are proposed for a later timeframe (2012-2015-2020) and fixed within an agreed FAB action plan. All these proposals are assessed both as a single project and, in some cases, as part of overall wider route network design activity, in order to estimate possible gains in terms of nautical miles saved by aircraft operators and savings in time, fuel and carbon dioxide emissions. In addition, in order to improve night time flight efficiency, a special catalogue has been established (Night DCT) which offers users around fifty direct and plannable route segments in addition to the current network during the night.

The modifications will provide a significant benefit to the airspace users, with a direct impact on operational costs per flight. For example, the single implementation of the route improvements will produce distance savings of more than 800 nm per night.

Another important approach within the project is the introduction of technical enhancements at a regional level between 2012 and 2015. This is designed to make best use of the technical infrastructure and reduce overall technical fragmentation across the region.

In conclusion, ENAV as BLUE MED coordinator, is a catalyst of many of the ATM technical and operational needs in the Mediterranean area, and serves as an important bridge for the expansion of the SES to include North-African and Middle-Eastern countries. ✈

Russia plans for growth

Russia's State ATM Corporation is leading a six year modernisation programme

Valery M. Gorbenko, Director General, Federal State Unitary Enterprise, State ATM Corporation of the Russian Federation.

The Federal State Unitary Enterprise (FSUE) State Air Traffic Management Corporation of the Russian Federation (State ATM Corporation) is the air navigation service provider for the Russian Federation. The Enterprise was established by government decree on 14 May, 1996, to meet airspace user requirements for air traffic services, ensure safety and regularity of civil aviation, and create a joint air traffic management system.

The State ATM Corporation area of responsibility extends over 26 million square kilometers across Russian sovereign territory and oceanic airspace; and comprises 15 branches. The diagram below illustrates the overwhelming size of the country; to travel from the westernmost to the easternmost point of Russia requires a 12 hour, one-stop flight, which passes through nine time zones. All this directly affects the activities performed by the State ATM Corporation.

At present, air traffic services are provided by 69 area control centres which ensure round-the-clock service to all aircraft operating flights over the entire territory of the Russian Federation. This extends from Kaliningrad to Vladivostok, from the North Pole to the

boundaries of Kazakhstan, Mongolia, China, Japan, and Korea. The total number of air traffic personnel employed by the company is 9,500, of which 7,300 are operational controllers. The total length of the air traffic routes that cross the Russian Federation add up to 610,000 km, and include 441,600 km of international routes.

The country plays an important role in transit air traffic travelling from Europe and North America to south-east Asia and vice versa. Asian, Trans-Asian, Trans-Siberian, Trans-Polar, Cross-Polar and Trans-Eastern route systems are being actively developed as part of transcontinental air traffic routes. In 2010, transit flights increased by 8.1 per cent over the previous year, with a 13.3 per cent hike in flights operating along the cross-polar routes. Overall movements rose 12.3 per cent in 2010 compared with 2009.

The State ATM Corporation works in close cooperation with adjacent states on airspace management issues. At present, there are 156 entry/exit points with 19 neighbouring states. Additional entry/exit points are being implemented

to meet growing air traffic demand. A further 12 new entry/exit points due to open on the borders with Estonia, Turkey, Kazakhstan, China and the US in 2011.

Reduced Vertical Separation Minimum (RVSM) is due to be introduced across the Eastern part of the ICAO European Region on November 17, 2011. A number of meetings dedicated to RVSM implementation were held in 2009-2010 involving member states from the region under the guidance of ICAO. The State ATM Corporation is cooperating with adjacent states to carry out a set of required measures, including implementation of relevant plans, hardware and software upgrading, personnel training and related issues. In mid-March 2011, the fifth RVSM Implementation Task Force meeting (EURASIA RVSM TF/5) will take place in Khabarovsk (Far East Air Navigation Branch) with the participation of states from the Asia-Pacific Region.

A modern state

The Enterprise has drawn up a modernisation programme called the Joint ATM System Modernisation of the
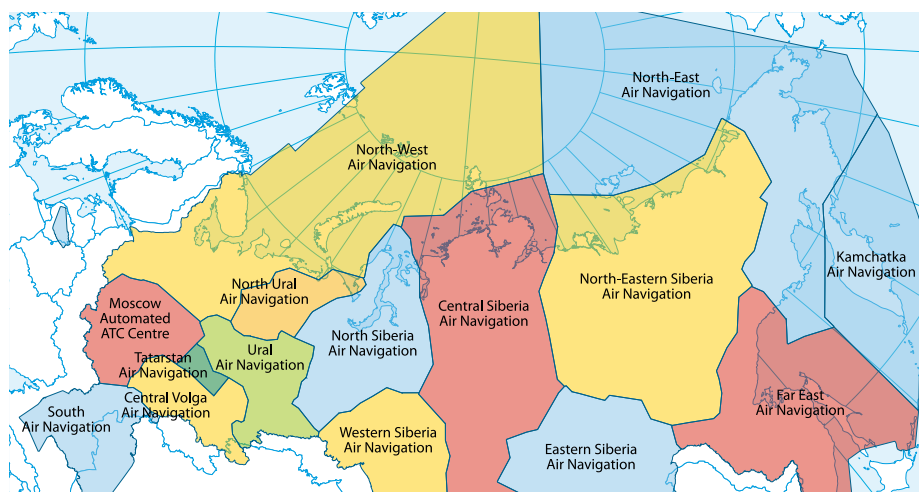
A non-stop flight across the Russian Federation lasts 12 hours and crosses nine time zones.

An autonomous VHF radio station in northeastern Siberia.

Russian Federation (2009-2015), which has been approved by the Government. The programme aims to increase flight safety and airspace efficiency through the modernisation of the Russian Joint ATM System, and to optimise airspace use by means of innovative equipment and technology. The programme is comparable with other modernisation programmes such as SESAR in Europe and NextGen in the US.

Among the key measures contained within the programme is the consolidation of area control centres, enhancement of terminal and en route ANS provision, modernisation of aeronautical telecommunications and data link networks, implementation of a single airspace management system, transition to CNS/ATM based technologies as well as establishment of integrated civil-military automated ATC systems.

The consolidation of area control centres is well advanced. The process is due to be complete by 2015 when 13 regional centres will take the place of the existing facilities. By the end of 2010, two such centres had already been established: In Moscow, the Automated ATC Centre Branch, and in Rostov-on-Don, the South Air Navigation Branch. In 2011, a consolidated centre at Khabarovsk will begin operations. Just a couple of years

ago the number of area control centres totalled 118. Today there are 69 and the programme remains on track to complete the task by 2015.

Between 2009 and 2015 investment in the modernisation programme is estimated to exceed EUR1 billion. In addition to the resources appropriated by the State ATM Corporation, the Russian Government renders assistance by allocating funds from the federal budget. In 2010, the major items of investment included consolidation of the area control centres, installing terminal ATC automation equipment in accordance with the federal targets; and ATM system modernisation in preparation for RVSM implementation.

During the coming years, 100 short-range navigation systems and over 100 terminal, en-route and secondary radars will be deployed. Over 50 satellite communication stations, 770 VHF/HF voice communication and ATIS stations are to be modernised. Additionally, 100 full-scale and visual simulators will be implemented. The scope of work is significant and it has to be carried out over large distances, often in harsh weather conditions.

The issue of personnel training deserves special attention. The State ATM Corporation carries out regular activities

in respect to the personnel training. In 2010, the number of employees who completed aviation English training and testing amounted to 5,400. This represents an increase of 20 per cent over 2009. Currently, about 300 employees reach ICAO Language Proficiency Level 4 every month. The activities being carried out by the State ATM Corporation will ensure the ICAO standard implementation by 5 March 2011.

The State ATM Corporation pays close heed to safety. To this end, the Enterprise attaches the same significance to safety management as it does to its main operational processes. Resources are targeted to support the establishment of safety culture, facilitate open and effective provision and exchange of safety information; develop and implement risk management processes aimed at identification of hazardous causes while mitigating risk to the lowest practicable level; ensure required personnel training in the area of safety as well as compliance of the staffing level and personnel qualifications with tasks performed; enhance safety assurance, and continuously improve organisational activities aimed at taking timely and effective safety measures.

In conclusion, the State ATM Corporation has developed and implemented the Quality Management System (QMS) in accordance with ISO 9001:2000 international standard and obtained a certificate thereof. In January 2010, the Enterprise successfully passed a recertification audit in accordance with ISO 9001:2008 standard. ✈

Ural Air Navigation Branch.

Schiphol tests green approaches

Long haul arrivals are set to benefit from optimised arrival streams

Dutch service provider LVNL is testing out a planning tool designed to smooth out the surge in early morning arrivals and reduce holding times at Amsterdam Schiphol in a partnership with KLM and NLR.

Amsterdam Schiphol is running a trial starting in the first half of 2011 which sets out to cut emissions and reduce bunching of aircraft during early morning arrivals. The trial is part of the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) programme managed by the SESAR Joint Undertaking. AIRE aims to demonstrate ways to reduce carbon dioxide emissions and Amsterdam was selected to show how a partnership between the ANSP, airline and airport can bring about significant savings.

The Schiphol project focuses on trajectory-based night time arrivals, in particular long haul flights that can plan their descent path 20-25 minutes out from the airport. The aim is to enable aircraft to participate as early as 60-90 minutes before landing to reduce inefficiencies in the arrival flow. Those flights that follow a Continuous Descent Arrival (CDA) and fly with engines at near-idle from top of descent realise significant fuel savings compared with a conventional step-down approach path. Using KLM data, the estimated average saving for a flight that performs a CDA, even for the final stage of descent, is 100kg of fuel.

Night time CDAs from low altitude have been in operation at Schiphol Airport for 15 years, helping to reduce noise in the greater Schiphol area. Aircraft fly required navigation (RNAV) instrument approach procedures, defined as a lateral path with associated speed and altitude constraints once they reach the Terminal Manoevring Area (TMA), about 30 nm from the airport. However, as the morning peak approaches, controllers have to vector or hold aircraft, increasing fuel burn and emissions.

The period between 04.00 and 06.00 is characterised by a wave of some 20 long haul arrivals primarily from the east, and Amsterdam controllers have to forge these aircraft into an orderly traffic stream before they enter the TMA to comply with the night time fixed arrival routes. The trial aims to reduce this bunching by starting an optimum descent path at top of descent while under Maastricht Upper Area Centre (MUAC) control.

For this reason the LVNL, Dutch airline KLM, and Dutch research establishment NLR have developed a planning tool to enable more frequent use of CDAs and less intervention by controllers. This is possible if an aircraft is controlled from an earlier stage of the flight in collaboration with adjacent centres and airline operations control centres. The procedure is designed to plan the time an aircraft enters the Dutch TMA, in particular to synchronise arrivals between the three initial approach fixes. The tool calculates the optimal schedule resulting in a high probability that the aircraft will be able to fly an undisturbed CDA.

On time arrival

The pre-planner is at the heart of the project. A central server is used to gather the estimated time of arrival (ETA) from down-linked trajectory data from the aircraft for one or more
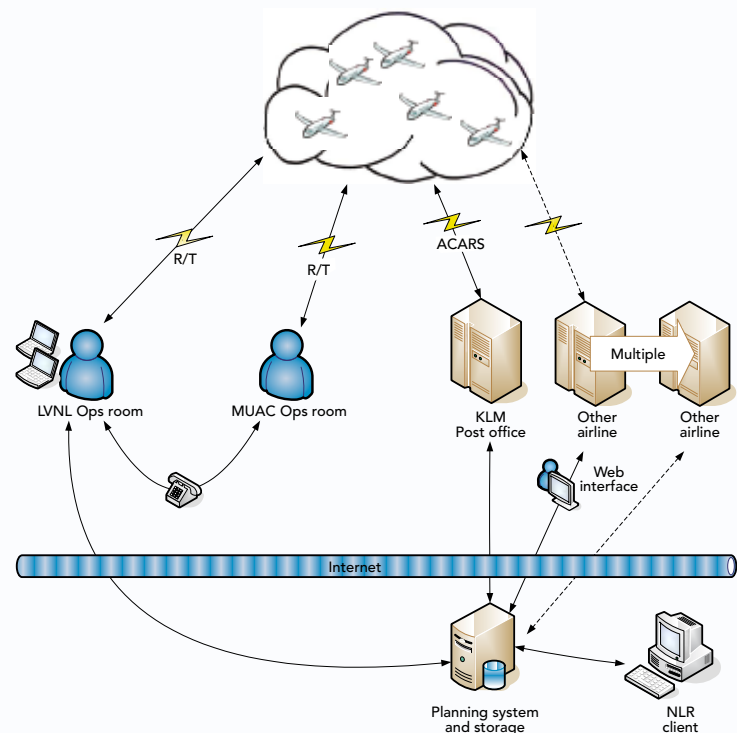
High level view of the interactions that take place from top of descent.

KLM saves an average 100kg fuel for each flight that performs a continuous descent approach to Schiphol.

points along its route. This data is used to make an optimised pre-planning schedule that estimates the arrival time at the initial approach fix (IAF). This is called the planned time of arrival (PTA). The Dutch controllers communicate the arrival plan to the airline operations centre. The arrival times are kept as close as possible to the downlinked (intended) arrival time, unless planning conflicts occur. The airline is responsible for uplinking the planned arrival time to the flight crew, who can either accept or reject it. Adjacent ANSP, NATS UK, has indicated interest in participating in the trial.

The pre-planning system must be fed with accurate planning data, typically 60-90 minutes before landing. These ETAs must be accurate to within 30 seconds to serve the performance requirements. The trial will demonstrate whether trajectory data generated by the onboard flight management computer (FMC) is sufficiently accurate for this purpose. The most common means of communicating ETA data is via ACARS text message via the airline operations data link, though web-based data transfer.

Occasionally radiotelephony can also be used. A very small number of flights use radiotelephony to coordinate with adjacent centres. The objective is to use the planning tool to build a pre-planning system that fills the gap between the (raw) flight plan data information and the near-horizon radar data that is currently used by the air traffic controller for inbound planning purposes.

On receipt of the FMS trajectory data, the system checks the route, position and ETA and generates a PTA for TMA entry. The air traffic controllers validate the PTA over the IAF as generated by the pre-planner before sending it to the airline operations centre to relay to the flight crew via an ACARS text message. The flight crew enters the PTA into the FMS which checks the time of arrival and makes any speed adjustments. Normal operating procedures will be in effect to deal with speed changes. During the trial, a CDA from top of descent will be tactically coordinated and cleared by ATC, similar to current operations.

A few aircraft not equipped to downlink trajectory data transmit their ETA information via radiotelephony

between the flight crew and MUAC controllers. MUAC relays the information to Schiphol controllers, also by voice, to enter into the pre-planner. Once the PTA is generated, the information is transmitted back by voice to the flight crew to accept or reject. This procedure is laborious, and likely to be used only a few times per night.

By using aircraft-derived data, the Schiphol trial is presented as a precursor to SESAR trajectory-based operations. In particular, it addresses the interface between en route and big-hub terminal area operations. Currently, aircraft that are behind schedule may increase their cost index to make up time only to find that they are part of a bunch and need to be vectored, or even need to hold, when entering the FIR. Early communication of the PTA aims to eliminate such inefficient operation. LVNL project manager Evert Westerveld says "the trial uses existing airline operations communications and does not require additional equipment. The trial is intended to demonstrate the principle that pre-sequencing aircraft enables optimised descent profiles."

The trial aims to conduct 500 flights during 2011 and compile airline data on fuel burn and emissions. First trials during May and June will test the system over five consecutive days. The emission reduction trial is scheduled for November 2011 when the outbound night charter traffic, which can conflict with inbound CDAs, has passed its Summer peak. The full trial will include lifting of altitude restrictions both for the Amsterdam FIR as well as the Schiphol TMA.

About 75 per cent of flights are from KLM and are able to participate in the trials. Delta, which has 10 per cent of flights also expects to participate, while all other airlines that have inbound flights within the time frame will be invited to join the trials. If an aircraft cannot participate, the pre-planning system will still try to facilitate an undisturbed CDA for this aircraft by using realistic estimates of the aircraft's ETA. The project predicts an emission reduction of approximately 80 tons over the trial period. ⚐

Voice over IP for ATM – ready for deployment

ATM is testing the ground before it embraces Internet Protocol (IP) based communications

The Internet Protocol (IP) network is cheaper, more flexible and easier to maintain than conventional communications infrastructure. It demonstrates it can meet the availability and reliability standards required for air traffic communications, and the industry is starting to recognise it as a viable alternative to present day networks.

There are three major factors driving the migration to Voice over Internet Protocol (VoIP) for air traffic management communication services. The first of these is the pressure on air navigation service providers to reduce costs. ANSPs need to lower communication network costs and the related savings achieved through IP technology contribute to increased productivity. The second factor is airspace flexibility. There is a need for much more flexible assignment of airspace in the future, such as the creation of functional airspace blocks, that requires interoperability between air traffic management entities. This interoperability implies that airspace sectors can be moved from one air traffic control centre to another, whether for load sharing or in an emergency situation like contingency operations or business resumption.

The third factor is the service availability of traditional telephony systems. Telecom service providers are moving to cheaper backbone technologies and phasing out their legacy analogue, 64kBit/s based and (within the next five to eight years) 2MBit/s based services.

A transformation process is therefore taking place: ATM communication technology is ready to support this new architecture and is moving towards IP-based packet switching.

IP technology is already widely used by governments and defence organisations as a mission-critical technology. However, safety and service continuity are of more paramount significance in the air traffic management domain. As a result, the transformation process must be planned carefully and requires certain preconditions. Safety is a major requirements in air traffic management. The IP-based network must provide the same, or better, backup and safety mechanisms as existing networks. Investment also needs to be protected. ANSPs have invested billions in their ATM infrastructure. This investment must be protected during the migration process by offering both legacy and new IP-based services at the edge of the communication network infrastructure.

There is also a requirement for service continuity. An ATM system cannot be switched off during transition to an IP network. This means the transition must be implemented step-by-step, supporting legacy as well as newly implemented systems. Finally, a new system needs long-term support. Investments in air traffic management are based on a perspective that extends for more than 10 years, so suppliers must guarantee long-term lifecycle support.

A carefully planned, step-by-step process satisfying the above mentioned criteria will guarantee a seamless and low-risk migration to a robust, flexible and secure IP network interconnecting the different service entities. In addition, industry partnerships will ensure a smooth transformation that follows the standards set by the ATM community.

The recent completion of standardisation activities for VoIP in ATM communications is a good example of how the equipment suppliers and ANSPs are defining the new ATM network.

In 2004, the European Organisation for Civil Aviation Equipment (EUROCAE) Working Group 67 was formed. Members of WG-67 include European ANSPs, suppliers of VCS equipment and ground-based radio systems for ATM, the US Federal Aviation Administration (FAA), Eurocontrol and telecom equipment suppliers.

The aim of EUROCAE WG-67's activities is to achieve interoperability of VoIP-based communication systems in ATM. The need to develop and agree international standards for voice and data communications networks is critical given the transition to globally integrated air traffic management through SESAR and NEXTGEN. Such standards will ensure a future-proof ATM communications infrastructure and guarantee long-term investment protection for the ANSPs.

February 2009 saw the official release of the first version of the three major EUROCAE WG-67 documents (ED-136: VoIP ATM System Operational and Technical Requirements, ED-137:

Image: Frequentis

Many ANSPs already include ED-136/137/138 references in their equipment purchase specifications.

Interoperability Standards for VoIP ATM Components, and ED-138: Network Requirements and Performances for VoIP ATM Systems). Inputs from the FAA were included and released in the 2010 with updates to the ED-137 Part 1 and Part 2 specifications.

Several ETSI Plugtest events have demonstrated system interoperability between various suppliers, including major companies like Frequentis and Northrop Grumman Park Air Systems. Successful field trials were held by the French (DSNA) and German (DFS) air navigation service providers in late 2009. In September 2010, the Icelandic air navigation service provider (ISAVIA), Frequentis and Park Air conducted a field trial that demonstrated the practical application of VoIP in ATM. This included live controller-to-pilot communication.

These tests also covered interoperability scenarios involving communication between the new IP-based equipment and the existing infrastructure, thereby verifying the step-by-step migration path to VoIP. All these tests confirmed the maturity of the ED-137 specifications for VoIP in ATM with regard to deployment in an operational environment. The validation process will be continued as part of SESAR Work Package 15.2.10.

The ED-136/137/138 documents are vital components of the global standardisation process for IP-based ATM voice communication systems. Support for this goal is underpinned by current consultations between the main international bodies, including Eurocontrol, the FAA and ICAO. References to ED-137 documents are planned to be included in the ICAO 'Manual for the ATN using IPS Standards and Protocols DOC 9896 edition 2.0'.

In February 2010, Eurocontrol formed the VOTE subgroup (VoIP in ATM Implementation and Transition Expert Group). The VOTE group addresses validation, transition and deployment issues related to VoIP-based communication services in ATM. The group is identifying solutions and delivering recommendations to interested parties, including ANSPs, industry, telecommunications companies and standardisation bodies.

Many ANSPs worldwide have already included ED-136/137/138 references in their equipment purchase specifications. European ANSPs already take into account the European Single Sky ImPlementation (ESSIP) draft VoIP process to fully implement VoIP for ATM before the end of this decade. The industry, including voice communication system, ground radio

station and recorder suppliers, has responded to the new VoIP for ATM standards by offering appropriate solutions based on these specifications.

The first large-scale IP-based (military) radio network using ED-137 specifications went into operation in Poland at the end of 2010. The Polish Air Force network consists of 4 centres and 23 radio sites with more than 150 radios. All sites are interconnected through an IP network across which all systems are interconnected using the ED-137 protocol. Although this is a military radio network, its size allows the operational capability assessment of ED-137 based radio communication, including simultaneous access to radio resources. The project was initiated in 2008 and the systems were delivered by Frequentis.

Beginning in 2011, the first countrywide IP-based network using ED-137 specifications for air traffic management will be deployed by DSNA in France. NextiraOne is supplying this IP-MPLS network, with Frequentis as a subcontractor for voice services.

The standardisation of VoIP-based communication services for ATM offers many advantages compared to proprietary solutions. Most suppliers will follow the available standards. This gives ANSPs more choice during the equipment purchase process and they are not bound to a single supplier. Interoperability between different supplier solutions is continuously being tested in dedicated interoperability tests and field trials, thus allowing the combination of equipment from different suppliers.

ETSI Plugtests were performed, in Sophia Antipolis (France) in April 2008, March 2009 and March 2010 and a new session is planned in June 2011 including 14 suppliers. The FAA, preparing NextGen implementation, has planned a VoIP Interoperability event in Arlington (Virginia) in May 2011. What these events demonstrate is that there is now a big community driving improvements and new features, which is something ANSPs can only benefit from.✈

Collaborative decision making
Information sharing leads to efficiency gain

CANSO Director General Graham Lake visited Gatwick Airport control tower in January to see Airport-CDM demonstrated.

Typically, airports today operate in well-defined vertical silos. Every partner involved in the smooth and safe transit of passengers knows exactly what's happening to each flight. Or do they?

In reality, each partner has a slightly different view. The simple fact that air traffic control does not exchange its up-to-date view with the ground handlers, who in turn do not exchange information with the catering companies, who in turn do not exchange information with the maintenance operatives, means that although everyone thinks they know what is happening, each has a different perspective and will make decisions based upon their own information.

The consequence of each party having a slightly different view is uncertainty and inefficiency. Essential resources are not always in the right place at the right time. Delays for passengers and increased costs for airport partners are inevitable. If, towards the end of a shift, the handling agent sends a crew to the stand, unaware of a flight delay, overtime payments are likely to be incurred. Or, if an aircraft lands ahead of schedule and sits waiting on the runway for a gate, unnecessary fuel is burnt – a highly important consideration in today's environment. In almost all cases, the relevant piece of information to prevent these situations arising was at the airport but it was not shared widely enough to make a difference.

Around the early part of the decade, Eurocontrol created a concept to address just these problems at airports, and in turn to solve an equally significant problem at a higher network level. The concept, Airport Collaborative Decision Making (CDM), aimed to improve operational efficiency at airports by reducing delays, improving the predictability of events during the progress of a flight, and optimising the use of resources. Airport CDM works on the principle that by sharing key pieces of information amongst the different airport partners, those partners can work together more transparently and efficiently and significantly improve their ability to forward plan. Airport CDM is not about creating new information, but finding the best quality data at any point in the chain and sharing it with others.

By looking at the operational management of an airport from the top down, we can see the interaction between the working parties and determine who needs to know what, and when. Armed with the same operational picture, parties can make better

Airport CDM at Gatwick – key facts

- CDM combines a number of data feeds from NATS, ground operations and schedule co-ordinators to create a real-time, comprehensive picture of airport operations. This enables better planning decisions leading to enhanced asset use and efficiency.

- The system went into partial operation in June 2010.

- When fully deployed, all airport operations will feed into a central database.

- The ultimate aim of CDM is to enable more slots to be created within peak hours to match capacity with demand within the existing infrastructure.

- NATS' capacity study, based on Heathrow data, indicates that taxi times could be reduced by up to several minutes per flight.

- When implemented, CDM will optimise runway throughput, which is crucial in a single runway environment. This will reduce outbound taxi time and queuing, delivering environmental benefits.

Airport-CDM involves a broad user group that includes controllers, airlines, ground handlers and airport organisations.

decisions based on the best quality information, enabling major increases in efficiency and operational cost savings.

When information is shared in such a way, the air traffic network as a whole is served with more accurate take-off information from which to derive air traffic control slots. As more and more airports implement Airport CDM, the network will be able to safely reduce the buffers that are currently used to account for uncertainty. What was once a theoretical concept is now fast becoming a necessary reality for all airports in Europe: Airport CDM is an integral part of SESAR.

Cultural and technical challenges

As Einstein famously wrote, "Problems cannot be solved by thinking within the framework in which the problems were created". The first step in any Airport CDM is not to be constrained by the existing situation, or to set about fixing the problem as if it were just another IT challenge. Airport CDM is as much about culture change as it is about IT, which is why the prime focus of the NATS Services' installation at Gatwick was to work closely with the airport on people and processes, not servers and databases.

With a number of different partners involved, it was hard to determine which organisation should drive the project. It was clear that a 'one size' solution would not fit all. NATS Services tackled these issues by looking at the operational goals of all the stakeholders involved and then designing a solution to help deliver them. Facilitating a cultural shift is as critical to success as developing the right technical infrastructure, and only with a sound operational perspective can the optimum technical solution be found.

At Gatwick, a cultural change was initiated to bring about the link between people and processes. The cultural change started with awareness and familiarisation of the new Airport CDM language, then system views, leading into radical procedural changes all of which had to be delivered to a very broad user group of over one thousand people, including airlines and ground handling organisations.

Managing complexity

One of the key elements of Airport CDM is the ability to project an accurate departure sequence, and whilst at smaller regional airports this may be simple, at larger regional and international airports it can be highly complex. The important Target Start Approval Time (TSAT) calculations at airports tend to be on a straight demand/capacity calculation. At London Heathrow for example, which has almost 1,400 air traffic movements per day, NATS Services has developed algorithms to manage significant levels of complexity. Testing of the TSAT Generator has shown the potential to make major reductions in taxi time whilst increasing the number of departures.

Despite perceptions that Airport CDM is a difficult project to deliver, NATS, working closely with Gatwick Airport, implemented the first phase of the fully compliant EUROCAE and Eurocontrol Airport CDM solution within four weeks and the next two within the following two months.

Working together, Gatwick Airport and NATS Airport CDM expect to improve operational efficiency and hence cost savings, cut passenger delays and reduce aircraft emissions through better management of data on site. Airport CDM will also enable a co-ordinated recovery from operational disruptions including the network hub response across Europe. ✈

The Middle East
Tackling airspace constraints

Dubai Airports Head of Aeronautical Strategy, Helen Woodrow calls for the region to unlock latent airspace capacity to support industry expansion.

**The success of the aviation industry in the Middle East is creating strong demand growth within an already extremely complex air traffic environment and regional forecasts predict this trend to continue.
In order to avert the capacity bottlenecks looming on the horizon, airspace constraints must be addressed through the development of a performance based, cohesive regional network strategy, which enhances predictability and commonality amongst the Middle East's air navigation service providers.**

In the Middle East, due to significant investment by the airlines, you find the world's newest and most modern fleets but they are operating within an airspace environment which does not make use of their advanced navigation capabilities. Leveraging the benefits of these fleets would not only enhance regional air traffic management but also reward those carriers investing in state of the art avionics through widespread implementation of capacity and efficiency enabling concepts such as dynamic airspace management and performance based navigation. According to IATA, Middle East and North Africa (MENA) carriers represent 11 per cent of global passenger traffic, up from 5 per cent a decade ago. In Dubai alone passenger numbers are expected to reach almost 100 million by the end of the decade. In response to this Dubai Airports has a number of facility expansion projects underway to accommodate anticipated passenger traffic growth, including the world's first dedicated A380 facility, Concourse 3. There is a growing awareness however that our investment on the ground could be jeopardised if not matched by progress in the air.

Whereas optimising runway capacity and implementing efficient systems and processes to accommodate and manage demand growth can be handled locally by airports, airspace capacity cannot be considered in isolation and initiatives to de-conflict air routes, reduce bottlenecks and unlock latent airspace capacity must be focused regionally in order to resolve capacity issues rather than simply shift them elsewhere in the supply chain.

Realities such as an outdated route structure and airspace fragmentation, if left unaddressed, will increasingly act as inhibitors to airline and airport growth. We need better coordination to find workable air traffic management solutions which will require governments, airlines, ANSPs, airports and other industry groups to work together and commit to investing time and resources to the development and

implementation of new systems and ways of working. Adding urgency to the situation is the fact that Middle Eastern countries plan to spend an estimated USD200 billion on new aircraft in the next 15 years and some USD100 billion in infrastructure to meet demand. The pace of airspace reform and investment in ATM research and development in the Middle East must escalate if we are to successfully align airline, airport and ANSP growth strategies.

In the rapidly growing Middle East aviation scene the success stories of airports, airlines and ANSPs are intrinsically linked. However, to date ANSPs in the Middle East have been relatively silent as to their mid to long term plans and this has meant that airlines and airports alike have had to forge ahead with ambitious expansion plans to address predicted demand growth based on a range of assumptions
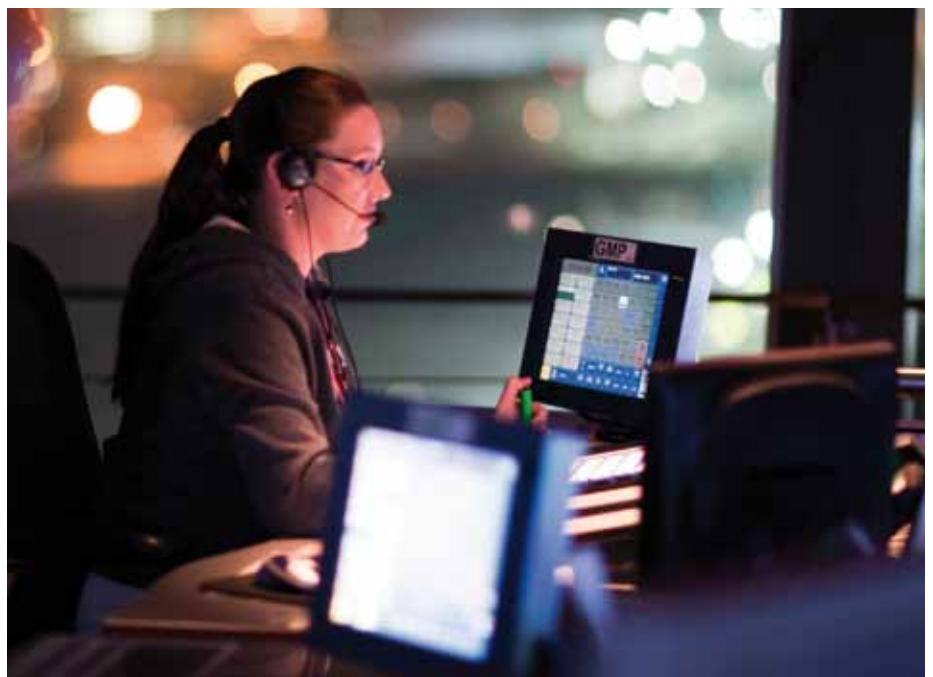
Dubai International is the sixth busiest airport in the world with connections to over 210 destinations across six continents.

with regards to future airspace capacity. Until ANSPs in the region produce and commit to the implementation of a cohesive regional action plan which alleviates airspace constraints and delivers additional capacity, airspace will continue to feature on the corporate risk registers of airlines and airports alike as the biggest challenge facing aviation growth in the region.

The whole system of managing air traffic needs to change if ANSPs are to become proactive participants in the Middle East's aviation industry value chain – and to do that, they need to take a good look at the way they currently operate and interact.

"Considering the hundreds of billions being spent on airport infrastructure and aircraft in the region, governments would be well served to protect these investments by collaborating closely on air traffic management," said Paul Griffiths, CEO of Dubai Airports following the signing of CANSO's UAE

Declaration in January. The Declaration proposes a joint Middle East Airspace Study to optimise the region's airspace structure. "Any initiative that frees up airspace should receive high priority as it would cut flight times, save fuel and emissions, boost trade and tourism and drive economic expansion."

''Middle Eastern countries plan to spend USD200 billion on new aircraft and USD100 billion in infrastructure in the next 15 years''

No-one has yet put a price tag on the cost of the current fragmented airspace system or quantified the environmental savings that a more efficient airspace structure would bring as data with respect to delays is not willingly shared by many service providers. However there is no disputing that there are significant gains to be made in terms of cost savings and the environment. The airspace challenge that lies ahead of the Middle East is encouraging an increasing number of ANSPs to participate in regional initiatives and share information and expertise with others.

So why is all the talking not being turned into tangible results? Where are the brick walls to progress and how do we break them down? There is an increasing awareness that no one entity has all of the answers or can act in isolation to address capacity issues. Communication and the commitment to achieve the best possible outcome for the whole system is the way forward if we are to ensure that the Middle East's aviation success story continues. ✈

Brazil – Intercontinental gateway
Regional modernisation is a priority for Brazil

The Brazilian air navigation service provider Departamento de Controle do Espaço Aéreo (DECEA) became a new full member of CANSO in September 2010. The organisation explains its unusual role as a provider of both military and civil air traffic services.

Brazil's vast airspace includes 8.5 million square kilometers of continental territory and 14.5 million square kilometers of Atlantic Ocean, making it one of the largest in the world. Extending from South America, Africa, Europe and the Middle East the region is an important intercontinental gateway.

DECEA is the operational arm of the Brazilian Airspace Control System (SISCEAB). It is responsible for planning, deployment, operations, and maintenance of the air traffic control system. It makes available services such as aeronautical information system (AIS), air traffic management, aeronautical telecommunication, aeronautical cartography, aeronautical meteorology, flight inspection and search and rescue. The organisation operates five area control centres; two of them located in Recife and the others in Brasilia, Curitiba, and Manaus.

DECEA employs more than 11,000 personnel who carry out operational and administrative duties for the five area control centres, 47 approach controls centres, and 59 air traffic control towers. The company maintains more than 900 Navaids, 90 aeronautical telecommunications stations plus other support divisions and subsidiary organisations throughout the country.

The Brazilian Department of Airspace Control has an unusual remit to provide air traffic control services for both civilian and military airspace users. The concept differs from many other countries because the department falls within the Ministry of Aeronautics. Military and civil

Air Traffic Controllers operate the Brasilia Area Control Centre (ACC-BS).

air traffic control operations are provided the Air Force, resulting in significant economies in resources. As a result of being under the aeronautical command DECEA applies the same communications, navigation and surveillance means to provide air traffic control services and to guarantee the defence of Brazilian skies. DECEA complies with the rules set by the Brazilian Airspace Defense Command and meets its duties to ICAO to satisfy all the annexes referring to air traffic.

Future systems

DECEA is fully committed to the implementation of CNS/ATM systems. Brazil has adopted the CNS/ATM concepts of technology integration, large-scale satellite surveillance and digital communications. Like US NextGen and European SESAR modernisation programmes, Brazil supports the safe and efficient development of world air traffic services. DECEA published its ATM National Operational Concept in 2008, also called CONOPS, which is the reference and guideline for all that concerns CNS/ATM implementation in Brazil.

There are several initiatives that have already been achieved based on the identification of operational requirements, availability of appropriate technology and allocation of resources. Among these are:

• The accomplishment of the Automatic Dependent Surveillance by Contract (ADS-C) established at the Atlantic Area Control Center (ACC-AO) in Recife, incorporating safety and effectiveness to the transcontinental air traffic flow over the Atlantic Ocean

• Implementation of Performance Based Navigation (PBN) in some Brazilian terminal manoeouvring areas including Recife and Brasilia

• Implementation with the start of initial tests of the Ground Based Augmentation Systems (GBAS) at Rio de Janeiro International Airport.

DECEA is working with CANSO to introduce improvements to air traffic management across Latin America beyond. The organisations are working hard to transform air traffic management performance in the region. ✈

Air Lieutenant Brigadier Ramon Borges Cardoso

Director General of Departamento de Controle do Espaço Aéreo (DECEA)

DECEA provides air navigation services for Brazilian airspace

DECEA is modernising its communications infrastructure. How is this improving ATC?

There are several initiatives underway to remodel and improve the country's aeronautical communication network. Among these, the adoption of Controller Pilot Data Link Communications (CPDLC) in the Atlântico Area Control Centre introduces digital technology and data commands for communications between pilots and control centres. CPDLC provides a substitute or complement to voice communications and brings safety and efficiency benefits to oceanic traffic flows, mainly in the EURO-SAM corridor.

Data communications will be extended to the whole country in the medium and long term. CPDLC will relieve saturated voice channels and reduce problems that arise from audio quality, linguistic barriers and sign propagation.

At the start of 2011 DECEA entered into a partnership with SITA to modernise the Brazilian aeronautical communication data network. The project includes upgrading the current DATACOM network with new VDL data link ground stations compliant with next generation ATN technology.

What other new technology is planned to enhance ATC services?

We can mention the implementation of the new air traffic control system Sagitario. Developed by a Brazilian company, the project is a replacement for the previous system also developed in Brazil, and will optimise air traffic services. The system supports the execution of the routine actions; helps to identify and avoid conflicts or risks situations; offers more flexible software configurations and decreases the air traffic controller workload. Sagitario is already in operation at the Curitiba Area Control Centre and in the medium term will be rolled out to the four other Brazilians area control centres.

In addition, the introduction of Automatic Dependent Surveillance by Contract (ADS-C) at the Atlântico Area Control Centre has made it possible to monitor all aircraft position reports – equipped with the necessary receiver – across the Atlantic Ocean. Tests with a similar tool more appropriate to continental areas, Automatic Dependent Surveillance Broadcast (ADS-B), are planned to take place at Bacia de Campos near Rio de Janeiro, where helicopters support the operation of oil rigs in the region.

Our planning is carried out in the context of international air traffic management, and in close association with our neighbours. We are in permanent contact with other South American countries, as well as air transport bodies and work groups including GREPECAS, SESAR Joint Undertaking and recently CANSO.

What new procedures are being introduced to meet airline demands to fly more efficient routes?

There are many. Activated in 2006, Air Navigation Management Centre (CGNA) is a central unit that monitors air traffic service provision 24 hours a day and responds to changes as they occur. These include adverse meteorological conditions, degradation of the airport infrastructure or similar events that require traffic flow to be restructured. The unit makes adjustments to ensure minimum disruption to day to day operations using the structure and human resources available. The unit includes permanent representatives of all the airlines, as well as the Brazilian National Agency of Civil Aviation (ANAC) and airport representatives who collaborate in the decision making.

Similarly, the implementation of the Performance Based Navigation (PBN) has brought results in terms of improved routes and reduced emissions. PBN redraws and optimises the structure of the navigation routes. It makes feasible the use of more routes in a smaller space, with reduced separations, or simultaneous approaches, to generate more capacity.

What are DECEA priorities going forward?

There are several actions under way. The first is in the domain of ATCO training, where DECEA aims to increase the number of controllers to match traffic growth of 10 per cent each year. Training is provided by simulators that allow the student to use the same systems and experience as the real operational system.

The restructuring of the routes network is of the utmost importance. This is being carried out together with other countries in South America. In addition, establishing PBN procedures in the main terminal areas (TMA) and on those routes characterised by dense traffic flow is a priority. ✈

canso

Who We Are and What We Do

Light area illustrates airspace
controlled by CANSO members

CANSO – The Civil Air Navigation Services Organisation – is the global voice of the companies that provide air traffic control, and represents the interests of Air Navigation Services Providers worldwide. CANSO members are responsible for supporting over 85% of world air traffic, and through our Workgroups, members share information and develop new policies, with the ultimate aim of improving air navigation services on the ground and in the air. CANSO also represents its members' views in major regulatory and industry forums, including at ICAO, where we have official Observer status.

JOINING CANSO

The membership of CANSO is drawn from a wide range of ANSPs and companies involved with the delivery of air traffic services. Membership offers them the chance to network formally and informally, exchange best practice, and contribute to CANSO Workgroups, delivering the standards and policies that will drive the future development of Air Navigation Services.

Full (ANSP) Membership is open to all ANSPs, regardless of whether or not they are autonomous of their government. Associate members can apply for either Gold or Silver status, which brings differing levels of access to CANSO Workgroups and event and advertising discounts. All members get a free listing in the CANSO Yearbook, and have access to the Global ATM Net, an extranet that is the hub of CANSO's activities, and home to an extensive member database.

For further information on joining CANSO, please visit www.canso.org/joiningcanso

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