THE CENTRAL FLOW MANAGEMENT UNIT

- 10 years of the CFMU: A European success story
- Getting there on time: The background to air traffic punctuality
- Interview with Jean-Robert Bauchet, Director of CFMU

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Dear Readers,

2005 was an excellent year for EUROCONTROL and for Air Traffic Management in Europe.

In spite of the accidents in the month of August and although complete data for 2005 are not yet available, there has been a significant downward trend in the European accident rate over the last few years – there is a difference of some 35% between the years 2001 and 2004. If 2005 sees the confirmation of this trend, then it would go some way to showing that our unremitting efforts to improve safety are bearing fruit.

Delay is being contained in Europe: En route delay has been virtually eliminated and is close to the economic optimum. The challenge now is to maintain this level of delay and action must be taken to ensure that this is done.

As for the medium-term, the first stage of the Dynamic Management of the European Airspace Network (DMEAN) programme is currently being implemented. DMEAN will arrange for enhanced cooperation and information exchange between all operational ATM partners. It will further reduce congestion by more dynamically matching airspace capacity with demand. DMEAN should be fully operational by 2009.

For the longer-term future, concrete plans are being laid, especially with the launch of the SESAR (Single European Sky ATM Research) programme by EUROCONTROL, the European Commission and a consortium of over 30 of Europe’s leading airspace users, airlines, air navigation service providers, airports and equipment manufacturing industries. This is the first time that such a grouping has come together to develop the future generation of air traffic management in Europe.

One of the more pleasant moments for us at EUROCONTROL was the celebration of the Central Flow Management Unit (CFMU)’s tenth anniversary of the beginning of its tactical operations.

The CFMU concept was created out of a troubled period in the 1980s when a surge in air traffic demand led to unprecedented delays. Ministers of Transport at the time determined that the only solution was to carry out air traffic flow management centrally so as to make the best possible use of all the available airspace capacity – and the CFMU was the result.

The past ten years have been challenging ones for the CFMU, but it has proved its worth conclusively many times over – its handling of the 9/11 crisis was one excellent example. Assistance given to Greece so that the capacity of all the available airspace would be smoothly managed is another.

Today, Europe could not manage without the CFMU – 2005 happens to have been the busiest year ever seen in our aviation history, with peaks of over 30,000 flights daily and more than eight million a year. But it cannot rest on its laurels and plans are currently being executed to make it even more responsive to users’ needs.

Altogether, the CFMU has proved to be a great success: a pan-European project, it has involved the close and dedicated cooperation of flow management professionals across the continent as well as the unremitting 7/24 efforts of its multinational staff to keep the service constantly available, consistent and reliable.

Victor M. Aguado
Director General

Chers lecteurs,

L’année 2005 aura été excellente pour EUROCONTROL et pour la gestion du trafic aérien en Europe. Malgré les accidents survenus au mois d’août et bien que les données de 2005 ne soient pas encore complètes, on enregistre, ces dernières années, une baisse significative du nombre des accidents en Europe, qui a diminué de quelque 35% de 2001 à 2004. Si cette tendance se confirme en 2005, nous pourrons sans crainte affirmer que nos efforts incessants pour améliorer la sécurité portent leurs fruits.

Les retards ont été maîtrisés en Europe : les retards en route ont virtuellement disparu et se rapprochent de l’optimum économique. Le défi consiste désormais à les maintenir à ce niveau et à prendre toutes les mesures nécessaires pour qu’il en soit ainsi.

En ce qui concerne le moyen terme, la première phase du programme DMEAN (gestion dynamique du réseau aérien européen) est en cours d’exécution. La DMEAN vise à améliorer la coopération et les échanges d’informations entre tous les partenaires opérationnels de l’ATM et à limiter davantage encore les encombrements dans le ciel par une adaptation plus dynamique de la capacité d’espace aérien à la demande. Le concept DMEAN devrait être pleinement opérationnel d’ici 2009.

Pour le long terme, les plans d’action se concrétisent également, notamment avec le lancement du programme SESAR (programme de recherche ATM dans le cadre du ciel unique européen) par EUROCONTROL, la Commission européenne et un consortium réunissant une trentaine d’usagers de l’espace aérien, de compagnies aériennes, de prestataires de services de navigation aérienne, d’aéroports, de constructeurs et d’équipementiers, tous de premier plan. C’est la première fois qu’un tel groupe se forme pour élaborer, de concert, la nouvelle génération de systèmes de gestion du trafic aérien en Europe.

À EUROCONTROL, l’un des moments forts de l’année a été la célébration du dixième anniversaire du lancement des opérations tactiques de l’Organisme central de gestion des courants de trafic aérien (CFMU).

Le concept du CFMU a vu le jour en réponse aux problèmes rencontrés dans les années 80, lorsque la hausse rapide de la demande de trafic a provoqué des retards sans précédent. Les Ministres des Transports de l’époque en vinrent à la conclusion que la seule solution résidait dans une gestion centralisée des courants de trafic, afin d’utiliser au mieux toute la capacité d’espace aérien disponible – et c’est ainsi que le CFMU est né.

Ces dix dernières années ont été riches de défis pour le CFMU, mais celui-ci a prouvé à maintes reprises qu’il était capable de les relever avec succès. La manière dont il a géré la crise du 9 septembre 2001 en est un exemple parfait, ainsi d’ailleurs que la façon dont il a aidé la Grèce à gérer l’importante surcharge de trafic générée par les Jeux olympiques d’Athènes.

Aujourd’hui, l’Europe ne pourrait plus se passer du CFMU : 2005 a été l’année de tous les records dans les annales de l’aviation, avec des pointes de plus de 30 000 vols par jour, et plus de 8 millions de vol sur l’année. Pour autant, le CFMU ne peut se reposer sur ses lauriers, et il prend actuellement des mesures concrètes pour répondre de manière encore plus souple aux besoins des utilisateurs.

En conclusion, on peut affirmer que le CFMU – projet paneuropéen reposant sur la coopération étroite et sans faille des professionnels de l’ATM du continent tout entier ainsi que sur les efforts continus déployés, 7 jours sur 7, 24 heures sur 24, par son personnel multinational pour assurer en permanence un service homogène et fiable – est un grand succès !

Victor M. Aguado
Director General
On 17 June 2005, a new record was set: 30,663 flights on one day. The European record for 2004 – on 10 September – has already been beaten twelve times so far this year. September 2005 saw the largest number of flights for any September since records began. The number of flights increased to 28,131 per day in September 2005 compared with 27,083 per day in September 2004, an increase of 3.9%.

Yet in spite of this increase in traffic, delay is being contained – and this is an excellent achievement. The average air traffic flow management delay per flight was 1.7 minutes in 2004, with an average en-route delay per flight of 0.9 minutes. En-route restrictions were the cause of only 12% of primary delay in 2004.

The 80s delay nightmares

In 1986, 12% of flights were delayed by more than 15 minutes. By 1989, 25% of all flights were delayed by this amount – or more. It does not sound a lot but in reality, delayed flights waited for hours – often all too literally.

The reason was mainly that air traffic control in the afflicted countries just could not cope with a sudden surge in demand. Politicians and their constituents were haunted by television images of people stranded at airports – sometimes even overnight – while they waited for their flight.

Action was taken. Air traffic flow management units were established in various States in an attempt to regulate traffic flows and to match demand with capacity. Air traffic flow management’s function is to regulate the flow of aircraft entering an area of airspace so that the controllers can handle them safely without being overloaded.

However, it was soon realised that flow control on a regional basis also gave
rise to problems: as each State tried to protect its airspace from overload by limiting the amount of aircraft in their skies, the airspace gradually grew more restricted, giving rise to yet more delay.

It began to emerge that the only solution was to carry out flow management centrally so as to make the best possible use of all the available airspace capacity.

The Ministers of Transport of the ECAC Member States accordingly met in Frankfurt in October 1988 to plan the beginnings of a Europe-wide, centralised air traffic flow management service. The management of this project was entrusted to EUROCONTROL, the European Organisation for the Safety of Air Navigation. It set up the European Organisation for the Safety of Air Navigation. It set up the Central Flow Management Unit, the CFMU.

**CFMU – the beginnings**

From 1989 to 1996, the CFMU gradually took over the different components needed for providing an efficient and safe flow management.

In October 1991, strategic operations began with the issuing of the first single, daily ATFM Notification Message, replacing a multiplicity of messages sent out by other Flow Management Units (FMUs) beforehand. By this time, development had also begun on the powerful computer systems needed to process the flight plans, provide a highly accurate demand picture and allocate the slots to the aircraft operators.

Pre-tactical operations for the ECAC States began in February 1994 when the CFMU moved into a new purpose-built complex at Haren, next to Brussels National Airport, housing its offices, computers and operations rooms.

The CFMU started initial tactical operations on 27 April 1995 when it took over the management of air traffic flows over France and Switzerland from the Paris FMU, known as CORTA (Cellule d’organisation et de régulation du trafic aérien). It also became responsible for the reception and processing of flight plans for France, Germany and the Benelux states.

On 9 November 1995, the CFMU expanded its tactical operations to cover the airspace of the 22 States which had previously been served by the Frankfurt FMU and its sub-units.

At the same time, in anticipation of the transfer of the London FMU, the United Kingdom authorities authorised the CFMU to manage part of the international traffic flows entering their airspace. Their remaining tactical operations were transferred on 13 January 1996. This step was swiftly followed on 1 February with the transfer of the activities of Rome FMU. The Madrid FMU’s activities (covering Spain and Portugal) were absorbed on 14 March, so completing the take-over of tactical operations.

The CFMU became entirely responsible for the whole range of air traffic flow management services with the start-up of operations of the Initial Integrated Flight Plan Processing Unit on 28 March 1996.

Until this date, users had to address their flight plans to both the IFPS and all the ATS Units concerned with the flight. Now, users send their flight plans directly to the IFPS alone. The IFPS is solely responsible for checking, accepting and distributing the plans to all ATS Units in Europe, so making for much simpler and more consistent processing.

IFPS is fast and efficient: it handles almost 45,000 messages each day and almost 80% of these are processed automatically. Of messages requiring manual correction by specialist IFPS staff, more than 90% are corrected within 20 minutes of their receipt by the system.

The CFMU runs two IFPS Units (IFPUs): one co-located with the CFMU at Haren and the other at Brétigny-sur-Orge, south of Paris. These two units are responsible for complementary geographic areas in day-to-day operations and can also provide contingency back-up for each other, so heightening both the system’s security and dependability.

**How the CFMU operates**

The CFMU is a dynamic organ that changes to match users’ needs, balancing both controllers’ and aircraft operators’ requirements.

The CFMU relies heavily on its network of collaborators who work in the Flow Management Positions (FMPs) in every Air Traffic Control Centre in Europe, many airports and some major airlines. They provide an essential link by relaying information on Centre capacity, traffic demand and other situations – such as adverse weather – to the CFMU. They are also central in the decision-making process.

Its sophisticated computer systems are continually revised, updated and improved in the light of operational experience.

The Enhanced Tactical Flow Management System (ETFMS) has the primary objective of ensuring safety, fluidity, best use of capacity, equity and transparency. ETFMS, which incorporates CASA, the Computer-Assisted Slot Allocation, and re-routing facilities, allows the controller to regulate flights and spread the consequent burden of inevitable delays as evenly and fairly as possible.

ETFMS also collects position information on flights in the CFMU area. This information is then combined with flight plan data (e.g. type of aircraft, flight plan route), ATFM information (e.g. the slot or the re-routing which has been attributed to the flight) together with...
detailed airspace information to produce a highly accurate database.

ETFMS provides the ATFM specialists in the CFMU and the FMPs with updated, accurate, sector loads for the current situation and the near future. This allows careful monitoring of the ATFM situation to be carried out and allows ATFM partners to adapt measures to fit changing circumstances. The tool is extremely useful in that it not only helps avoid potential overload in good time, but also ensures that regulatory measures are only applied for just as long as is necessary.

One major plus that the CFMU has is that it can respond rapidly to users’ requirements in that the Operations department as well as those services dealing with customer relations and user groups are in the same building as the architecture managers and the software developers. This co-location promotes the smooth interchange of ideas and improvements; the fact that the developments are all tailor-made to meet the users’ requirements exactly, ensures that the quality of service provided by the CFMU is unrivalled.

As for the future, the CFMU believes that tactical, real-time flow management is on the cards. Today, flows are managed through regulation which essentially keeps aircraft on the ground until it is safe for them to fly. Through flight streaming, flights will be rerouted around blocked areas even while they are en-route.

The CFMU has, in fact, turned progressively towards providing not just flow management services but capacity management as well. It is working on broadening its scope to a gate-to-gate approach, including airports as well in its area of activities. This enlarged focus will help capitalise on the network effect which is so vital to the kind of cooperation the CFMU specialises in.

Collaboration

Cooperation and collaboration for the CFMU is vital.

Without effective and constant cooperation with the Flow Management Positions, the CFMU would simply not function. Essentially, flow management is a network function and requires constant, clear exchanges of information.

Collaborative Decision Making is an area in which the CFMU is playing an increasingly stronger role. An interactive tactical daily briefing has been in operation since 2003. It uses e-conferencing technology over the internet and is used by all ATFM partners. Stakeholders are able to raise issues directly with the tactical network coordinator in the CFMU operations room and sort them out instantly.

Basically, there are five areas in which the CFMU concentrates its cooperative efforts:

1. Airport Operations: airports are becoming of increasing importance and are being incorporated to a much higher degree in ATFM planning.
2. Airspace Management: the CMFU optimises interfaces with all airspace users.
3. Flight Data Consistency and Dissemination: the collation and provision of up-to-date flight data is an essential task of the CFMU’s.
4. Critical Events: The CFMU is particularly well-placed to help define scenarios and procedures for responding to sudden and unpredictable events. More details on this important activity will follow.
5. Support to Regulatory Processes: the CFMU provides operational advice in defining roles, responsibilities, rights and obligations for flow management processes within the context of the Single European Sky initiative.

The benefits

A recognised authority, known for its performance and neutrality, the CFMU brings its partners many benefits. Here is a list of some of them:

- A single flight plan processing system makes for greater accuracy as operators, airports, air traffic control centres and CFMU all work with the same data.
- All users are monitored by the system and delays are evenly spread. The powerful central computer system ensures that there is a global regulation of ATC sectors and sophisticated algorithms and high-speed processing ensure that all airspace users are treated equally.
- Operators can rely upon slots being delivered on time – without exception. They also benefit from faster reaction times: even those flight plans filed late will usually receive a slot within one minute of the information’s being received by the CFMU.
- The CFMU provides an independent, comprehensive, standardised and accurate database on all flights throughout the operating area. This data provides the statistics which are used in measuring ATFM delays as well as for giving planners reliable and complete information, making their task easier and more effective.
- The CFMU deals with a wide variety of States, air navigation service providers and operators – of all kinds and of all nationalities.
Crisis management

The CFMU is especially useful when a crisis of general proportions arises.

For instance, it can help contain the problems caused by severe weather or industrial action. Thanks to its wide-scale operating area, its ability to re-route flights at fairly short notice and the excellent relations it maintains with operators and national air traffic authorities alike, disruption in these circumstances can be minimised.

In the 9/11 crisis, it gave clear proof of how effective a centralised system can be: immediately upon receiving the notification that US airspace had been closed, the CFMU informed each European air traffic control centre, airport control tower and 250 aircraft operators of the fact. Within just four minutes of the original announcement, each flight scheduled to depart from Europe to the United States was prevented from leaving and those aircraft already in mid-flight were either diverted to safe landing places – in Canada and the Caribbean – or returned to their original airports.

Airspace had to be made available to accommodate the returning aircraft, so the CFMU prevented other flights from taking off and allowed the homeward-bound aircraft to fly through European skies safely.

Over the next few days, the CFMU adjusted the traffic flows to the gradual opening of oceanic airspace. In order to ensure that the new arrangements were complied with, the CFMU filtered each flight plan received, singling out those which had filed to fly in domestic US airspace. Each aircraft operator was then contacted individually and instructed to reroute the flight.

In large measure due to the CFMU’s successful handling of the 9/11 crisis, it was decided to expand its portfolio of tasks to incorporate a crisis management cell to deal with any future large-scale emergencies.

Delay reporting

The CFMU prides itself on maintaining absolute transparency. It sends real-time information messages prior to the implementation of measures to all its partners and also provides a series of reports on a regular basis. Many of these reports can be found on the CFMU part of the EUROCONTROL website, including:

- a daily report, which includes the details of regulations managed by the CFMU, the areas causing delays, various average delay figures, and specific comparisons such as delay per origin (airport, state, operator, etc.);
- a monthly summary, this includes general figures such as total monthly delay, graphs showing the evolution over the last 12 months or showing the distribution of delays over geographic areas.

The CFMU records all data on traffic demand and on ATFM activity in an archive database. This database contains a wealth of information on what has happened in ATC across the continent. It is used to provide information to operational managers in every ATC centre, the CFMU and national air traffic authorities, so that they can monitor the traffic situation and have relevant data to hand.

In conclusion

The CFMU cannot, by itself, create more air traffic capacity. But it can and does make certain that the capacity that does exist is used to its fullest extent. Every effort is being made, in close collaboration with all its partners, to ensure that the systems are perpetually improved.

The CFMU is an achievement of which all players can feel justly proud; it is the tangible result of a collective desire to overcome problems and rise to a general challenge. All members of its multinational personnel are determined to carry on building on the success that the project has already enjoyed, perpetuating its motto of transparent and equitable service, throughout European airspace.
Air Traffic Flow and Capacity Management

Optimising the efficiency of the ATM system

The challenge

One of the key challenges for European air traffic management in the years ahead will be to accommodate safely and efficiently the growing number of flights, which are expected to double (reaching 16 million flights per year by 2020).

The answer: to improve air traffic flow and capacity management

The efforts made by the Central Flow Management Unit (CFMU) have served Europe well since the unit started operations in 1995. However, the new air traffic demands mean that the role of the CFMU and that of all key ATM players will have to evolve to ensure that congestion, with the associated delays, does not reappear in Europe.

In this regard, the CFMU has already identified issues it must address if it is to meet the demands being placed upon it. More specifically, there is a need to develop an increasingly integrated ATM system in which the available airspace capacity meets demand.

Today this is reflected in a new strategy based around Air Traffic Flow and Capacity Management (ATFCM).

This will mean that the CFMU will have to change from being simply a mechanism for delivering slots to one that proactively manages capacity and gets the best out of the ATM system by cooperating closely with its partners – the military, airspace users, airports and air traffic control centres, using collaborative decision-making techniques.

This process of optimisation, together with network management and improved service quality are major steps paving the way for Air Traffic Flow and Capacity Management.

Improving ATFCM will ensure that the available ATM capacity is matched more effectively with traffic demand.

The essence of ATFCM

Key drivers

ATFCM continuously and proactively considers all possible ATFCM solutions through an iterative seamless process from strategic planning to execution of the operations. The capacity to anticipate events on the basis of new information makes it possible to minimise their impact on the network or to take the opportunity to fine-tune the plan accordingly.
The ATFCM overall approach relies on planning the required capacity and optimisation of its use by organising slot allocations as far as possible in order to minimise the impact on aircraft operators. An inclusive and transparent collaborative decision-making process between all partners allows the implementation of local solutions based on global ATM awareness.

Collaboration with ATM partners

The ATFCM overall approach relies on expanding the relationship between ATFCM and other ATM activities. This collaboration focuses mainly on the exchange of accurate ATM data and sharing of information (flight plan, airspace, critical events, etc.) and ensures equity between all stakeholders through regulatory processes.

The CFMU

In fulfilling the ATFCM role, the CFMU acts as facilitator in the process, taking advantage of the network effect, and as a central repository for the relevant flight and airspace data. This provides the CFMU with an overview of the network implications of any particular constraint to smooth traffic flow. This in turn enables it to take on a coordination role, in close collaboration with the other actors, to find the optimum ATFCM solution for any given set of circumstances. And, consequently, the CFMU can act as a key player in coordinating any unplanned crises or contingency situations.

Benefits

The new ATFCM strategy meets the changing ATM requirements in a dynamic way, through:

- Improved ATM capacity planning, based on more accurate traffic forecasts and awareness of civil and military requirements.
- Optimisation of the available capacity in order to meet the airspace users’ needs and minimise the implementation of flow measures.
- Best use of network capacity
- Enhanced common awareness of current and planned capacity, airspace and traffic situation through information sharing and exchange among all partners.
- A higher quality of service, focusing on airspace users’ needs.
- Safety enhancements through the management of critical events.

Conclusion

ATFCM is moving away from the current focus on avoiding saturation, towards optimising the overall efficiency of the ATM system for all airspace users. This is in line with the changing ATFM scenario driven by the need to develop an increasingly integrated ATM system in which available airspace capacity is matched with demand.

Further information on the ATFCM Strategy can be found at: www.cfmu.eurocontrol.int
Early in the eighties the first steps were taken to address the problem of the excessive delays plaguing European skies. The increasing air traffic volume outstripped the capacity of the existing air traffic control systems. ICAO and EUROCONTROL worked hand in hand to remedy this situation.

Some ATC authorities started a programme to provide more capacity, and a number of Air Traffic Flow Management Units (ATFMUs) were established. EUROCONTROL developed, implemented and operated the Central Data Bank, later renamed Data Bank EUROCONTROL (DBE). The DBE provided “traffic counts” which gave an approximate idea of the traffic demands to be expected at airports, reporting points or sectors within the airspace of the participating States. ATFMUs worked with these figures in order to organise their traffic so that demand would not exceed the capacity in their airspace. Each ATFMU operated independently, mostly on a national scale, and each had its specific method of addressing the problem.

Although the situation initially improved, in the end these measures proved insufficient. As traffic continued to rise, the situation deteriorated so much that by 1988 delays had again become a serious problem. By then, 12 ATFM Units had been established in Europe. However, the system as a whole was not efficient for handling such increasing traffic volumes.

Again ICAO and EUROCONTROL took a hard look at the situation and concluded that it was necessary to carry out Air Traffic Flow Management (ATFM) on a continental, European scale. ICAO had developed the Centralised Traffic Management Organisation (CTMO) concept that proposed a single Flow Management Unit (FMU) in liaison with Flow Management Positions (FMPs) in every ATC unit. The Member States of the European Civil Aviation Conference (ECAC), which covered virtually the whole continent and which would eventually expand to do so entirely, asked EUROCONTROL to create and operate a Central Flow Management Unit (CFMU) on their behalf that would undertake ATFM throughout their airspace in accordance with the principles laid down in the CTMO concept.

The then Director General of EUROCONTROL, Keith Mack, submitted a CFMU implementation plan to the Member States that was approved by the Permanent Commission on 4 July 1989. The plan provided for the establishment of a CFMU, to be operated by the Agency, to provide an ATFM service across the airspace of the ECAC States. That decision was in itself remarkable. There were 23 ECAC States at the time the decision was taken and not all of
these were Member States of EUROCONTROL. This meant that the said States undertook to finance a system which would provide a service also benefiting others that had not contributed to its establishment – indeed a generous and far-sighted attitude.

Arrangements therefore had to be made to allow these ECAC States participating in the project that were not EUROCONTROL Member States to bear a fair share of the CFMU’s operating costs. As the status of many European nations vis-à-vis both organisations changed – it will be remembered that these were the times of the implosion of the communist regimes in Eastern Europe – continuous adaptations of the scope of the CFMU project were required during its implementation. By the time the CFMU went into operation, it covered 32 ECAC States.

The project, the people

It was quite natural to start from what already existed. That was the DBE, which had been functioning within the Operations Directorate for four years at the time of the decision. The then Director Operations W. Philipp from the outset was firmly in favour of rising to this new and demanding challenge for the Agency.

Mr Philipp set up a task force to establish the implementation plan. Experience gathered from DBE operations was most useful as a basis on which to build. But now greater challenges had to be addressed. Accurate flight information was required that could only be assembled from flight plans, so these would have to be made available for all flights within the airspace covered. The CFMU would thus have to be able to receive, correct, and distribute flight plans. That was a major change compared to the DBE, which processed essentially flight programmes published by aircraft operators for each season. Furthermore, an accurate analysis had to be made of the functions and systems required to realise the CTMO concept.

In record time the “White Book” was drawn up. It contained a detailed implementation plan for the CFMU, including a description of the operational functions to be developed, the building requirements, the systems to be implemented, the staff to be recruited, the appropriations required for investment and operation, and the time-scale of project execution. The document was excellently written and has been the guideline throughout the realisation of the project. Great merit is to be given to its authors. Apologising to those whom I may have omitted involuntarily, I would like to mention the names of Pierre-Olivier Jeannet, who would become the project leader, Peter Schmutz for the technical parts and Brian Martin for the operational input.

As the project evolved, owing to an extension of its geographical coverage and additions to the scope of the services demanded, all changes to the data contained in the “White Book” were properly documented and submitted for approval to the pertinent bodies supervising the implementation of the project, inside and outside EUROCONTROL. In this way confidence was built up between all partners in the project. There were many such partners as they included the States, their ATC units, and obviously the aircraft operators. Several bodies were set up to involve all these stakeholders in the coordination process.

Coordination and cooperation

First of all there were the existing ATFMUs. They needed to remain in operation while the CFMU was under development. It was agreed that five of them should work together, on behalf of the others, so as to provide to the users a service that appeared to be centralised. These units were located in Paris, Frankfurt, London, Rome and Madrid and were known as the FMUs of the Central Executive Unit West. EUROCONTROL coordinated the activities of these five FMUs. That was no easy task since in essence this coordination had
as its ultimate objective the creation of conditions under which each of these existing units could eventually be phased out as their duties were merged into the single CFMU.

In 1992 the CFMU was established as a separate EUROCONTROL Directorate of which I had the honour to become the first Director, after having served for two years as Head of the DBE. Great care was taken to address operational, technical and social aspects of this transfer process. ATFM controllers for the CFMU were recruited from the staff of existing FMUs and contacts with management and unions were established. From November 1992, pre-tactical ATFM planning began to be transferred to the CFMU and this process was completed in February 1994. The transfer of day-to-day tactical ATFM operations from the FMUs to the CFMU started on 27 April 1995 when CORTA (the Paris FMU) operations were transferred – that is why we are celebrating ten years of the CFMU this year – and was concluded on 14 March 1996 with the transfer of MADRID-FMU. Credit is due to Brian Martin, Head of ATFM Operations, and his successor John Penwarne, for successfully conducting this transfer process.

Of course, a lot of hard work preceded these successes. Firstly all the systems were developed, and when that had been achieved they had to be sold, as it were, to their future customers. A working group of the five FMU States and the aircraft operator organisations – and here I must mention Colin Hume and the late Kjell Nilsson – helped the CFMU with the operational evaluations of all CFMU systems before these were put into operation.

Coordination at management level with ICAO, national authorities, service providers and aircraft operators has been conducted through a specialised body, the Flight Data and Flow Management Group (FDFM). The FDFM has always been a great driver of progress and has provided constant support to the CFMU. It has thus contributed substantially to the success of the undertaking. I am very pleased to acknowledge the value of the work of this group and the merits of its successive chairmen: Jim O’Farrell, Philippe Jacquard and Keith Williams.

A major stakeholder is of course the community of aircraft operators. IATA¹ and IACA² have been consulted throughout the project and both organisations have participated in the definition of functions and the evaluation of systems. Moreover, since October 1993 a permanently manned Aircraft Operators Liaison Cell has been in place at the CFMU. The Cell acts on behalf of all aircraft operators.

Within the EUROCONTROL Agency, a special coordination body at Director level was established. The successive Directors General, Keith Mack and Yves Lambert – who paid us a visit within the very first days of his mandate to express how important he felt the CFMU project to be – chaired this body. Its role was to take major decisions and foster political support when required.

Conclusion

I think that anyone who has had the chance to work towards the realisation of a great and arduous project, as the establishment of the CFMU was, takes great satisfaction from such an undertaking. The burdens borne are more than offset by the joy and pride in such an achievement. I feel immense gratitude to the many people at all levels who have made their contribution, each in their own manner. Without them the project could not have been brought to a successful conclusion. I have already named a few, but I keep the names of many others in my heart.
The origins – 1980s

Volume of air traffic in Europe grows steadily resulting in worsening delays
- Many flights incur delays greater than 1/2 hour.
- Many disruptions in ATM.
- ATC does not trust the ATFM system.

ICAO develops the Centralised Traffic Management Organisation concept:
- A Central Flow Management Unit (CFMU).
- A Flow Management Position (FMP) in each Air Traffic Control (ATC) Centre.

October 1988
The Transport Ministers of the ECAC States decide to implement the concept and to create the Central Flow Management Unit.

The management of this project is entrusted to EUROCONTROL.

4 July 1989
EUROCONTROL Permanent Commission’s approval.

The Agency set up a CFMU Project Team.

The build-up – 1990s

October 1991
Participation in pre-tactical operations begins with the issuing of the first single, daily ATFM Notification Message, replacing a multiplicity of messages.

February 1994
Full pre-tactical operations for the ECAC States with the move of the CFMU into a new purpose-built complex at Haren, Brussels.

28 April 1994
Start of flight plan collection by IFPS (The FPL capture is a prerequisite for Tactical ATFM).

27 April 1995
The CFMU starts its initial tactical ATFM operations. CFMU takes over the management of air traffic flows over France and Switzerland with the transfer of the French CORTA (Cellule d’organisation et de régulation du trafic aérien) to the CFMU’s Central Executive Unit (CEU).

9 November 1995
The CFMU expands its tactical operations to cover the airspace of 25 European States (following the transfer of the Frankfurt FMU operations to the Brussels-based CFMU which started up in October 1995). 40 air traffic control centres in Europe are now coordinating their respective traffic flows directly with the CFMU.

At the same time, the UK authorities authorise the CFMU to manage part of the international traffic flow entering UK airspace.

14 January 1996
All remaining UK tactical operations are transferred to the CFMU.

1 February 1996
Transfer of the activities of Rome FMU.

“A European success story”

10 years of the CFMU
1995 - 2005

The CFMU is a remarkable achievement of which all players can feel justly proud: It is a cooperative effort that continues to this day and must continue into the future to ensure that the dramatic increases in demand for airspace do not result in Europe’s skies becoming congested once again.
14 March 1996
The CFMU takes over responsibility for managing the air traffic flows over Spain and Portugal from the Madrid FMU. This is the final step in the transition to a centralised air traffic management system.
Responsibility for managing the flows of air traffic within the airspace of the 33 Member States of ECAC is henceforth centralised within the CFMU.

28 March 1996
IFPS full operations
All flight plans of the CFMU area are collected and redistributed to ATS Units by IFPS.

Handling crises
EUROCONTROL participates in the implementation of measures to tackle major crises.

March 1999
Outbreak of the conflict in Kosovo
- Closure of a portion of airspace over Bosnia and Herzegovina impacts traffic over Croatia, Hungary, Italy, Romania, Bulgaria, Slovenia and FYROM
- A resulting 30% increase in delays
- The CFMU works in close cooperation with ICAO, NATO, aircraft operators, ATC centres and airports to ensure the safe rerouting of traffic and to minimise the impact of the crisis.

September 2001
Attacks on the World Trade Centre
- The CFMU is the key coordination point for all air traffic movements across the Atlantic and in European airspace.
- Responsible for the safety of all flights in Europe, adjusting the traffic flows to the gradual opening of oceanic airspace.
- Working in close collaboration with the FAA Command Centre, the US government, military authorities and NATO.
- The CFMU is able to handle the crisis because of its unique, advanced tools and excellent communication channels in Europe and in North America.

Since start of operations
- Participation in the management of crises has become fairly frequent for the CFMU.

The evolution
The CFMU is a dynamic system that is changing in line with demand in a perpetual attempt to match users’ needs, balancing both controllers and aircraft operators’ requirements.

Over the last 10 years the CFMU has paved the way for a new generation of flight-plan processing technology that has become essential to managing traffic flows across Europe.

Delays caused by ATFM have been steadily contained then reduced, while traffic growth has resumed strong growth after the 11 September attacks.

July 2001
Adoption of the ATFM Action Plan by the 11th Session of the Provisional Council.
February 2002
The CFMU introduces accurate Enhanced Tactical Flow Management System (ETFMS)

- ETFMS uses radar-derived data, hence, greater flight data accuracy, improved ATFM and a common view on the air traffic flow situation that will be of benefit to the entire air traffic management network.

April 2004
Publication of the ATFCM Strategy giving new orientations to Air Traffic Flow and Capacity Management and in particular to the CFMU development.

The present
Strong growth in traffic with delays lower than ever
Today the capacity offered by the air navigation service providers is adjusted to match demand.

2004
The busiest year on record in Europe, with over 8.8 million flights.

- Yet, delays remain at an all-time low.
- A total of 8,871,242 flights, up 4.8% on 2003.
- The fastest annual growth rate for any year since 1999.

2005
Traffic expected to be about 9.2 million flights, 4% up on 2004.

Into the future
“The CFMU will have to change from being simply a mechanism for delivering slots to one that proactively manages capacity and gets the best out of the system by cooperating closely with its partners”. Jean-Robert Bauchet, Director CFMU.

The CFMU is constantly introducing improvements to ensure it meets the predicted doubling of traffic in European airspace by 2020. Its focus is on:

- Improving collaboration:
  - Collaborative Decision Making
    Solving problems within the network.
  - E-conferencing
    A powerful tool to manage traffic flows.

- Enhancing accuracy and consistency of data:
  - Use of radar-derived data
    Around 80% of ECAC flights are now updated after their departure using this information. Operational utilisation of this information has advanced and has enabled an improved assessment of traffic demand.

Traffic over 1989 - 2005 and delays over 1996 - 2005
Evolving role:
- Implementation of a new Policy and Strategy plan for the future
The CFMU has developed, together with its stakeholders, a Strategy for Air Traffic Flow and Capacity Management and an Evolution Plan addressing the future development of ATFM and the CFMU over the next 15 years.
- towards a more cooperative management of capacity and demand;
- bringing airports within the ATFCM Collaborative Decision-Making Process.

A single flow management system over Europe
- 35 European States
- 75 en-route centres with 450 control sectors
- 70 local flow management positions
- 560 airports
- 250 aircraft operators
- 3,500 end-users regularly connected to CFMU
- more than 9,000,000 flights a year
- peaks more than 30,000 flights a day

CFMU works in a network with:
- National air navigation service providers
- Aircraft operators
- Airport operations
- Military authorities
- EUROCONTROL Agency
- ICAO - ECAC
- NATO
- Rest of the world – FAA, ...
Interview with
Jean-Robert Bauchet

Reviewing developments over the past five years, CFMU Director Jean-Robert Bauchet applauded the quality of the unit that he inherited from his predecessor and considered that his main achievement was to have moved this top-quality tool to a Central Operational Unit.

"Proof of this is that today nobody in the aviation community can imagine Air Traffic Management without the CFMU function."

When I started (at the CFMU) I had set myself the objective of "legitimising" the CFMU – to position the unit as a key actor in European flow management. Today, the entire aviation community recognises its added value."

The CFMU has become a fully-fledged operational unit with all that implies as regards operating procedures, culture change and expansion of influence.

And Jean-Robert Bauchet had the right kind of background to help to make this happen. He had considerable experience in operations as well as a wealth of professional expertise in aviation gained across France. He started his career in the French administration, where he held several posts, including that of engineer in the Marseille UAC/ACC, head of the French department responsible for coordinating operations and development of all UAC(s)/ACC(s), Adviser to the Air Navigation Director, General Manager of the Paris UAC, moving on to take on responsibilities in the field of development and management of the French Airports at the headquarters of the Direction générale de l’Aviation Civile, before joining EUROCONTROL in 2000.

The CFMU has achieved this not on its own, but through its ability to evolve and work together with its partners. Jean-Robert Bauchet, who has been Director of the CFMU since April 2000 and is shortly concluding his term of office, discussed this achievement with Skyway.

The EUROCONTROL Central Flow Management Unit (CFMU) is now internationally recognised and respected. It has become essential for the management of the flow of traffic across Europe in a way that provides a much more efficient air traffic management system.

Another key achievement under Jean-Robert Bauchet’s directorship has been the implementation of a major technical project for the CFMU – the Enhanced Tactical Flow Management System (ETFMS). Launched prior to his arrival, he stressed that ETFMS has been an extremely ambitious project involving a change in the CFMU’s entire systems architecture and the introduction of new software.

ETFMS in fact provides the air traffic flow management (ATFM) specialists in the CFMU and the flow management positions across European air traffic control centres with updated, accurate, sector
loads for the current situation and the near future. This facilitates careful monitoring of the ATFM situation and allows ATFM partners to adapt measures to fit changing circumstances.

He also established the Air Traffic Flow and Capacity Management Strategy, which has moved the European system from focusing on avoiding saturation towards optimising the overall efficiency of the system. The result of this change in strategy can be seen in the delay statistics: in 2000, the average daily delay in the summer period was 120,000 minutes; by 2004, the average had been reduced to some 50,000 minutes—a remarkable achievement!

**Key challenge**

The CFMU’s challenge is to continue to evolve and adapt to new circumstances and to provide better value for air navigation service providers and airspace users alike. In this connection, Jean-Robert Bauchet asserted that the changing scenario resulting from the entry into force of the Single European Sky (SES) legislation in April 2004 represented the greatest present and future challenge for the CFMU and its partners.

“In the course of the last decades, the SES regulations have been a major development in European ATM,” he remarked. “It has been particularly demanding to position the CFMU, a unit of EUROCONTROL, within this context”, especially with respect to the call for separation between service provider and regulator.

**Understanding customers**

“Understanding the customers’ needs is crucial”, he argued. It is precisely with this in mind that the CFMU Director has developed over the years direct relations with CFMU partners, moving away from the existing formal structures of meetings, task forces, etc.

“I consider it vital to establish and maintain direct contacts with all our partners, contacts that are carefully cultivated in an atmosphere of trust, and to discuss issues in a transparent manner.”

The CFMU Director stressed the need to promote cooperation and the extensive exchange of knowledge among all their partners. “Direct contacts are a prerequisite to understanding each other. The more you know your customers and their demands, the more you can help them by providing the appropriate service.”

And understanding the needs of its partners has been a fundamental element of the success of the CFMU.

“By partners, we are naturally referring primarily to the air navigation service providers and airspace users,” he clarified, “including both civil and military authorities.”

“In fact we provide a public service which is equitable and does not discriminate between the various customers. The needs (of our partners) are not identical and that is why it is so important that we are aware of their specific needs,” he stressed.

“To understand is to evolve,” he continued. “Flexibility and adaptability are necessary in order to meet the dynamic requirements of ATFM”. To comprehend means developing flow management from the current system to a more cooperative management of capacity and demand, involving the entire European network.

**Ongoing initiatives**

A key project is currently under way within the Central Flow Management. It involves on the one hand the merging into a single operations division of the two previous “flight data operations” and “flow management” divisions, on the other hand the layout of a single “Ops room”. Started in September 2005, the latter project is expected to be complete by the end of 2006.

This is part of the drive to develop the CFMU into a more business-orientated operation and is part of Jean-Robert Bauchet’s efforts to reorganise the CFMU along operational lines and to obtain the recognition the unit deserves as a centre of ATFM excellence in Europe.

This adaptation will improve service provision by optimising the application of cross-border skills, by achieving synergies and contributing to cost-efficiency and enhanced decision-making through a fully integrated and transparent process.

“At the same time, we have recently completed the extension of the contingency site in Brétigny (France) by doubling the surface of the building,” added Bauchet. “Now the CFMU in Brussels has a complete back up. This will allow us to optimise further our contingency arrangements, and also to think about the respective responsibilities of the two sites Haren and Brétigny.”

Issues for the future, he said, will include the development of strategies for the technical reorganisation and the identification of how to build up the new systems required in the tasks of the new CFMU strategy.

**The vision**

Bauchet has expanded the influence of the CFMU beyond Europe. He saw ATFM as not just a European but worldwide phenomenon and immediately began a process of “globalisation”.

After September 11th he insisted that the links between the FAA Command Centre and NavCanada be enhanced and that regular e-conferencing be introduced as both a crisis manage-
“Our relations with our partners across the Atlantic have been further strengthened since the tragic events of 9/11. On that day, the CFMU was instrumental.”

“The CFMU will be the indispensable European unit dealing with ATFM,” Jean-Robert Bauchet said. “Today the CFMU is the key actor at European level. As it is increasingly becoming interconnected with the other continents, the CFMU will gradually embrace a more global dimension.”

“All these achievements have been realised thanks to the support from the EUROCONTROL States and the great job done by the CFMU staff,” Jean-Robert Bauchet proudly said. “All 550 people (working at the CFMU) have at different levels contributed to its success”.

“Our relationship has not always been easy but it is precisely though difficulties that we have made the CFMU stronger and consolidated its role, together,” he remarked.

He stressed that, as far as his staff were concerned “L’avenir leur appartient (the future is in their hands)” since a great deal more needs to be done for the further advancement of this unit.

Jean-Robert Bauchet hands over to his successor, Jacques Dopagne, a dynamic unit that is constantly adapting to meet the demands of the changing ATM environment, expanding its horizons and establishing ever closer relations with its customers.

In terms of expanding the influence of CFMU across the continents, the Cooperation Agreement concluded with the Russian Federation in 2001 by the Director General on behalf of EUROCONTROL will certainly be key.

“As a result of this move, Moscow ATFM Centre now has CFMU terminals which are used daily by the Russian flow controllers. This allows us to have a link with this territory,” he stated.

“The Russian Federation is strategically important for Trans-Siberian and Transpolar traffic,” Bauchet said. “With air traffic set to grow in Eastern Europe and in the Asian countries, it will be even more crucial to cooperate closely with our Russian partners.”

“On that day, the CFMU was instrumental.”

As Jean-Robert Bauchet put it, he has managed to set a solid foot in the US and to make a step towards Russia. The latter move will have to be consolidated.

Of course the southern reaches of the globe have not been forgotten. The CFMU already enjoys close cooperation with the African continent. Morocco and Algeria are part of the CFMU network and are very active partners.

**Conclusion**

Jean-Robert Bauchet has been at the forefront of European ATM for forty years and throughout that time he has demonstrated a vision and commitment beyond national and continental boundaries.

At the 50th Air Traffic Control Association Annual Conference and Exhibition held in the United States on 1 November 2005 he was the recipient of the “David J. Hurley Memorial Award” for his “outstanding achievement in the field of Aviation Traffic Management and his contribution in maximizing airspace and airport use, which has added to the quality efficiency and/or safety of the National Airspace Systems”.

This was a personal recognition but at the same time, as Bauchet remarked, a recognition of the EUROCONTROL CFMU as a remarkable European achievement which must continue into the future.

**Bauchet’s legacy**

Over its ten years of operations, the CFMU has steadily built up its in-house expertise and knowledge of ATFM, and its level of contacts with the European aviation community players is second to none.
Jacques Dopagne will be the Director of the Central Flow Management Unit (CFMU) with effect from 1 January 2006. He succeeds Jean-Robert Bauchet, who leaves the Agency after having served as Director CFMU since April 2000.

Mr Dopagne has over thirty years’ experience in air traffic management. Thoroughly conversant with matters both operational and institutional, he also has a solid background in the management of both people and projects.

After two engineering degrees obtained at the prestigious Ecole nationale de l’Aviation civile in Toulouse, France – his native country – he forged a career for himself in the French Ministry of Transport. One of his posts was heading an office in the General Directorate of French aviation where he dealt with airspace organisation and managed large-scale air navigation equipment programmes. Subsequently appointed advisor to the Director of Air Navigation - a position he held for three years - he represented the French civil aviation administration at discussions held by ECAC and EUROCONTROL on the ATM Strategy 2000+ and the revised Convention.

He held his latest post since 1998, serving as General Manager of the Paris Regional Air Navigation Centre (Centre regional de la Navigation aérienne de Paris – CRNA Nord), France’s biggest ACC with over 700 employees.

Jacques Dopagne brings a great deal to EUROCONTROL: pertinent knowledge and experience as well as an array of highly-honed skills in a variety of essential areas.

And he is not new to the CFMU. As he put it: “In my past career I have had opportunity to meet the staff of the CFMU on various occasions. I admire their professionalism and ability to work closely with all the partners to find (common) solutions”.

He highlighted that the CFMU is highly respected and its role in air traffic flow management recognised across the entire ATM community. In his view, the CFMU is a truly European success. “Whenever there is a problem (be it technical, operational or weather-related), the CFMU is there to address it and find a solution at European level.”

He continued to say: “Air traffic controllers trust (the CFMU) as they are protected from overload of traffic in their sectors and this has significantly contributed to increasing capacity across Europe.”

When talking about the decision to create the CFMU and to entrust its management to the EUROCONTROL Agency, Dopagne stated that this was an important strategic decision. He went on to stress that more specifically he recalled the year 1995 when he was advisor to the Director of Air Navigation, Philippe Jaquard, the man who played a key role in the development of the CFMU. In this connection, he remembered very well the time when the French CORTA (Cellule d’organisation et de regulation du traffic aérien) became the first unit to be transferred to the CFMU.

“At the beginning there were some technical problems and local and regional airlines were critical (of the CFMU) but airlines such as Air France, operating across Europe, saw the great advantage of having the CFMU,” he explained.
Jacques Dopagne appointed to lead the Central Flow Management Unit

Dopagne is very proud to have joined the CFMU and he is looking forward to embarking on this new journey. He intends to prepare for the future in a consolidated manner, working with all stakeholders. “At the CFMU we need to work as a team” and he continued to say: “I will work with all Agency units.”

When asked what his first priorities would be, Dopagne highlighted four. First of all, he wants to learn, listen and meet all the people who work in the CFMU and the Agency.

“Secondly I intend to pursue the excellent work done by the CFMU over the last ten years – in a spirit of continuity.”

Thirdly, one of his priorities will be to focus on cooperation with the military authorities with a view to making better use of the available airspace through a wider implementation of the flexible use of airspace concept in Europe.

Fourthly, he stressed the importance of working with airports. “Some of Europe’s airports are coming under increasing pressure in terms of traffic (they have to handle),” Dopagne argued. “There is a need to develop concrete procedures in order to involve all the players and to establish a consolidated approach towards identifying and resolving capacity bottlenecks”.

In this respect, he talked about DMEAN, the Dynamic Management of the European Airspace Network, a crucial programme for the next five years.

“The CFMU will be involved in this programme to a great extent,” he explained. “This is a main challenge for Europe in the coming years.”

DMEAN is a short-term solution to enhance air traffic management, airspace efficiency and capacity, while reinforcing cooperation between all air traffic management partners.

The future success of the European air traffic management system will in fact depend on how well the different players collaborate.

“With the help of air navigation service providers, States, civil and military airspace users, airports, we must be able to deliver the extra needed capacity, while enhancing safety levels, and the CFMU will play fully its role in this endeavour,” Dopagne concluded.

Skyway wishes Mr Dopagne and the Central Flow Management Unit a period of highly successful development under his management.
Mr Angenendt, how do the air navigation services organisations benefit from the CFMU?

First of all, please allow me to congratulate the CFMU on the excellent work it has performed over the past ten years. It has firmly established itself as a multi-State institution in Europe. Over the years, a centralised ATFM has been set up, and it is considered a fixed element of the air transport system by all stakeholders in Europe.

This brings me on to one of the most important functions of the CFMU. The CFMU acts as a moderator between the individual stakeholders in discussing key issues such as capacity and flow management. It also enhances coordination processes between air navigation services organisations. It has always safeguarded the interests and taken due account of the responsibilities of the individual providers. From the point of view of the air navigation service providers, this will continue to be one of the CFMU’s main tasks in the future.

What role is played by the CFMU in the harmonisation of the European airspace?

The CFMU has, of course, been involved in the implementation of the Single European Sky initiative. It is playing a major part in ensuring that the European ideal of networking airspace is put into practice. The progress made to date has been mainly thanks to Jean-Robert Bauchet, its outgoing Director. A great believer in European goals, Mr Bauchet has guided the CFMU along the path to success over the past five years. One example of his work has been the development of and responsibility for the European AIS Database (EAD) in close connection with CFMU operations. Jean-Robert Bauchet has turned the CFMU into the great organisation it is today.

How will the CFMU and the air navigation service providers cooperate in the future?

Roles and responsibilities must be clearly defined and be transparent to all parties. Cooperation in the future must be in line with the ATFCM strategy. Establishing Functional Airspace Blocks (FABs) will have consequences for CFMU operations. One of the key tasks of the CFMU over the next two years will be to implement the ATFCM strategy in the individual FABs and develop the basis for the cooperation between the CFMU and each of the FABs.

What impact will the Single European Sky (SES) have?

In the coming years, the SES will have an even greater impact on our actions than has been the case up to today. Making the right decisions is crucial to air transport as a whole, and particularly to air navigation services organisations. Passengers and the European economy as a whole also benefit when air navigation services enhance their performance. The cost-effectiveness issue will certainly become increasingly important in the future.

Can you be more specific?

The main thing is to ensure that the CFMU and air navigation service providers can continue to handle air traffic in a safe, orderly and expeditious manner. At the same time, the air transport industry must remain a creator of new jobs. This is particularly important for promoting prosperity in the European economy.

Air navigation service providers will come under increasing cost pressure in the future. The cost situation will be aggravated by the rising price of raw materials. This pressure is bound to take its toll not only on the services but also on certain functions, such as ATFCM. In this connection, the same cost-effectiveness parameters must be observed by all parties. However, in order to stay competitive, the air navigation services organisations have no other option but to make their services more productive, while maintaining the high level of safety. In other words, the philosophy regarding the “zero tolerance” of errors remains in place.
Le défi actuel et futur

L’application complète du concept FUA

Le CFMU est, du point de vue militaire, indispensable du concept FUA. En effet, la gestion souple de l’espace et la libération, par la Défense, d’espaces d’entraînement au profit du trafic commercial constituent le principal canal d’action des militaires vis-à-vis de l’ATFM.

Ces dispositions ont permis une amélioration de l’écoulement et de la fluidité du trafic grâce à une meilleure gestion de l’espace aérien.

Cependant, la situation actuelle n’est pas optimale et devra être améliorée pour faire face au défi de la croissance constante du trafic.

Le FUA a provoqué une révolution dans les méthodes de travail des armées de l’air des pays qui l’appliquent. Cet effort est accepté, mais seulement s’il conduit à un résultat optimal dans l’utilisation des espaces rendus disponibles.

Cela ne sera possible que si sont garanties :
- une coordination étroite entre les AMC nationales et le CFMU ;
- une exploitation rapide des informations utiles ;
- une réactivité appropriée de la part de tous les acteurs.

Le défi actuel et futur sera d’atteindre l’optimisation du fonctionnement du CFMU dans le cadre du FUA, compte tenu notamment de sa prise en compte par le projet Ciel unique.

L’une des raisons qui expliquent cet état de fait est que le CFMU ne dispose pas de toutes les informations traitées par les AMC, mais seulement d’informations parcelaires selon l’origine et la nature de la source d’information (positions FMP par exemple).

Par ailleurs, on constate que l’espace rendu disponible, et identifié comme tel, est trop souvent insuffisamment utilisé et ne modifie la capacité annoncée par les CCR que de façon relative.

Évolution

La situation actuelle construite sur une application partielle du FUA montre que le système a atteint la limite permise par les conditions dans lesquelles il est appliqué, dans les pays où c’est le cas.

Une évolution est donc indispensable pour pouvoir améliorer la gestion de l’espace aérien et l’exploitation opérationnelle efficace de l’espace rendu disponible.

Situation actuelle

Le CFMU agit sur le processus ATFM dans le cadre des principes du FUA. Hélas, ce dernier n’est pas encore appliqué entièrement par tous les acteurs concernés. On constate que certains pays l’appliquent en partie alors que d’autres ont encore des difficultés à le mettre en œuvre, ou fonctionnent d’une manière qui ne leur permet pas de voir facilement les bénéfices à court terme que cette application leur apporterait.

Il s’ensuit que le CFMU n’est souvent pas en mesure d’exploiter complètement et à l’échelle européenne les disponibilités potentielles d’espace dans les délais requis.

1- Organisme central de gestion des courants de trafic aérien
2- Utilisation flexible de l’espace aérien
3- Gestion des courants de trafic aérien
4- Cellules de gestion de l’espace aérien
5- Poste de gestion des courants de trafic

Améliorations possibles

Par l’ensemble des acteurs

Une première voie d’amélioration serait de formaliser la mise en œuvre d’une coordination systématique entre le CFMU et les AMC nationales, ce qui permettrait d’obtenir une vision globale de la disponibilité de l’espace à l’échelle européenne.

Le deuxième et incontournable progrès serait l’application complète, dans tous les pays concernés, des niveaux stratégique, pré-tactique et tactique du FUA.

Il serait possible d’aller plus loin encore en accélérant l’exploitation et la circulation des informations sur la disponibilité des espaces et des routes, aussi bien dans le sens descendant que dans le sens ascendant. L’accélération de la remontée des informations vers le CFMU doit en particulier permettre à ce dernier d’établir au plus tôt la situation de l’espace disponible et d’en informer les compagnies aériennes et les CCR.

Finalement, améliorer la réactivité et la souplesse des services ATS et des utilisateurs pour l’exploitation des routes aériennes disponibles permettrait incontestablement de revoir la capacité globale à la hausse, tout en réalisant des économies sur les trajets parcourus et les attentes éventuelles. Pour cela, il est indispensable qu’à la suite de la collecte, de l’exploitation et de la diffusion rapide de l’information par le CFMU, le CFMU et les AMC comme les CCR/FMP ajustent leur capacité à la hausse grâce à l’espace obtenu et que les compagnies aériennes fassent preuve de la réactivité nécessaire en utilisant cet espace et cette capacité pour optimiser leurs vols.

Par la Défense

Dans le contexte des mesures à prendre pour améliorer globalement l’ATFCM, les acteurs de la Défense peuvent contribuer par plusieurs actions.

La première est certainement d’aborder le CFMU afin de s’intégrer au plus près dans le processus de mise à disposition de l’espace disponible, et de raccourcir au maximum la boucle de circulation de l’information entre l’utilisateur qui libère un espace et celui qui va pouvoir en bénéficier.

Mais ce rapprochement ne peut être pleinement efficace que si les militaires s’impliquent dans une participation active au sein de leur AMC nationale, assurant ainsi un rôle d’acteur proactif au sein de cette structure.

L’action des militaires pourrait également consister à faciliter et accélérer la circulation des informations pertinentes en amont comme en aval, tout en améliorant la connaissance et la compréhension mutuelles des difficultés des uns et des autres.

L’intégration efficace des acteurs Défense dans le processus ATFCM leur permettrait aussi, en connaissance de cause, de détecter et d’identifier plus tôt et plus facilement les points bloquants prévisibles par rapport à leurs plannings d’activité à moyen et long terme.

De plus, à la lumière de l’expérience acquise auprès du CFMU, leur participation à la définition des réseaux de routes conduirait naturellement à des résultats supérieurs, et l’acquisition de cette « vision CFMU » leur permettrait de prendre part activement et efficace-ment à l’analyse des causes des points bloquants à l’origine des régulations.

À l’heure où le Ciel unique annonce des évolutions réglementaires majeures, il est indispensable de veiller à ce que l’organisation de l’ATFCM accompagne les changements qui vont intervenir et continue de poursuivre une gestion optimale de l’espace aérien et de son utilisation.

Pour cela, il sera nécessaire de considérer les habitudes actuelles et de veiller à ce que tous les organismes concernés travaillent ensemble au plus juste niveau. Cela impliquera une coordination renforcée entre les AMC nationales (voire sub-régionales un jour) et le CFMU, un traitement rapide et efficace des informations disponibles et, surtout, une exploitation réactive de ces données par tous les acteurs de la navigation aérienne, au sol comme en vol.

Les militaires sont prêts à participer à une telle démarche d’implication supplémentaire, qui leur permettra de mieux voir et de mieux défendre les bénéfices produits par les efforts consentis lors de la mise en œuvre du FUA.

Airline traffic has always had periods of growth and then stabilisation followed by more growth. During the mid-1980s we saw growth at rates that had not been forecast by the industry at the beginning of the decade. Suddenly delays were increasing significantly and IATA raised its level of activity in international meetings, working with ICAO and the States to find solutions to the high delays.

Airlines were sending experts to work alongside the IATA secretariat, not only European-based airlines such as Lufthansa, Air France, KLM and British Airways but also Pan American and TWA were involved using managers from their European dispatch centres, adding weight to the input.

The initial answer from the providers to use 13 regional flow units was a step forward but was very cumbersome and airlines would need to hold on the telephone for long periods waiting for a ‘slot’. The system became a little more productive when the 13 units were reduced to 5 but still the telephone calls between the airlines and the flow units took up a lot of time.

When the ICAO Centralised Traffic Management Organisation concept was approved in October 1988, the news was welcomed by IATA as the only way forward and with the approval of the CFMU Implementation Plan in April 1989, IATA again stepped up its involvement, this time playing an active part in the EUROCONTROL meeting structure. The Flight Data Flight Management (FDFM) Support Group dealing with many of the development activities was actually chaired by airline representatives, first from Dan Air and then British Airways.

Following some direct cooperation between the fledgling CEU, the French Director General of Civil Aviation and IATA/IACA1 during a French strike in 1990 the seed was sown for an Airlines Operators Liaison Cell to be part of the CFMU. This took the cooperation a further stage with a permanent presence within the CFMU management area of representatives from both IATA and IACA with the brief to represent the interests of all aircraft operators, not only their own members. Late in 1993 the cell was set up full-time assisting with pretactical planning. The role of the cell has changed and developed over the years and is still considered by the airlines to be a very useful interface.

The key was and is still the existence of independent airline experts directly within the CFMU management corridor who need to maintain credibility with the aircraft operators and have open access to all levels within the CFMU.

When CFMU tactical operations started progressively in 1995 there was a new way of working for everybody. Suddenly the delay pattern changed with many domestic flights that had previously not been restricted receiving delays. The result of this was that the longer flights were subject to less delay than before and we started to see much more equity in the system. However, there were also a lot of confusion because of a multitude of new messages to learn and a lot of man-hours were spent in educating the airlines.

Many airlines were initially doubtful that the CFMU was a benefit. Progressively, however, the airlines gained more confidence in the system and confirmed their full acceptance.
that the CFMU had been the right way forward and considered that any suggestion to go back to a de-centralised structure would be a backward step.

Along with the benefits from a co-ordinated approach to flow restrictions has been the development of tools enabling airlines to interface with the system in some detail. From the start of the system planning, it was the airlines themselves who insisted on a transparent approach including the flight plan details of every flight being open to all concerned. The initial tool (the RTA computer terminal) and the new message exchanges were very advanced compared with the old telephone but the current internet-based interface is a major step forward laying the foundations for even better graphics in the future. IATA believes that the CFMU should continue to develop this tool and supports moves towards 3D graphics.

We have seen some exceptional increases in traffic over the last few years that have stretched the system to the limits. Airlines have had to accept more reroutes and level capping in order to avoid or reduce delays. Some of the measures have been difficult to accept but the comments from the airlines again point to the fact that without centralised coordination through the CFMU the delays would have been unbearable.

How the CFMU is currently managed and financed will probably change but the important point is that IATA wants to continue to be closely involved with both the current operational problems and future developments. Only through good collaboration and cooperation will the travelling public be properly served. The providers and the airlines must continually work together and understand each others’ problems working to overcome them.

Can the CFMU improve its performance? Yes of course it can, it is no different from any other part of the system and must not become complacent simply because delays have been significantly reduced. There is room for improvement in data capture, strategic coordination, handling of significant disruption and staff knowledge of the problems that airlines face. As far as we see it, the CFMU is taking all of this onboard.

The operations room has seen changes in the way it is managed but further work can be done in this respect and IATA welcomes the combining of the two separate operations rooms at Haren into one, after all this is the way that airlines have always operated.

We see the challenge for the CFMU as one of maintaining a central role overseeing the network in Europe but at the same time allowing local initiatives that avoid the loss of available short-notice capacity. This does not mean that we want any kind of fragmentation. All local initiatives will only work if properly co-ordinated via a centralised function.

As we go forward with the Single European Sky, we want to see the CFMU move away from mostly flow management to a role of traffic and capacity management. It will not replace the role of air traffic control but rather enable ATC to do their job more efficiently acting in a way as a broker between several ACCs and as a tool to ensure that the ATM system works to the benefit of aviation.

IATA wants less complexity and more flexibility in the future ATM system. The CFMU must play its part to achieve this. Air traffic will continue to grow. This is part of the general economic development of Europe and indeed the world. We all need to revisit our methods of operating to ensure that we make the best use of current capacity.

There is no shortage of airspace in Europe but we are limited in how much traffic it can accept because of human capabilities, airspace structure and separation limitations. Technical developments will allow more aircraft to be handled, they must in order to accommodate the doubling of traffic by 2020 and beyond. The service provided by the CFMU must keep up with these developments.
CFMU essentially acts as a coordination centre for European flight planning. Its core activity is management of the Integrated Initial Flight Plan Processing System (IFPS) through which more than 38,000 messages are processed every single day and distributed to all relevant Air Traffic Control (ATC) units in more than thirty-four European States known collectively as the IFPS Zone. CFMU further uses the data it collects through this activity to ensure that at any given moment there is sufficient ATC capacity available to handle demand on the airspace in as efficient a manner as possible through its Air Traffic Flow and Capacity Management (ATFCM) programme, which is designed to ensure that the capacity of the airspace is fully exploited and that no one part of the system becomes overloaded, thus generating delays.

Some 25,000 flights use IFPS Zone airspace every single day and it is testament to the efforts of the CFMU, that after a peak in delays in the later part of the 1990s, while demand on the airspace has increased year on year, the delays have decreased. In 2004, the last year for which data is presently available, 8.87 million aircraft passed through the IFPS Zone while the average delay per flight has fallen to just 1.7 minutes. The cut in delay has been achieved primarily through judicious application of strategic, pre-tactical and tactical ATFCM.

With demand from air traffic increasing in the core IFPS Zone an average of 5% per year, there are still issues to be addressed in managing the airspace efficiently and maximising further still the capacity of the system. On this, the 10th anniversary of CMU there is no room for complacency and still many challenges ahead believes Head of Operations Division, John Byrom. Several distinct challenges lay ahead, he says, and, if CFMU is to maintain and preferably reduce further still delays within European airspace, it must develop in the area of capacity management, improve traffic flow management, enhance network management and ensure a quality of service to airspace users. He adds that by focusing on the areas above, CFMU is aiming at managing the airspace to the extent that flow control measures will only be needed in exceptional circumstances.

Given the continual rise in air traffic demand on what is a finite amount of airspace, that is a lofty goal by any stretch of the imagination, but one that CFMU believes is attainable. He believes that better training and improved communication are two of the key elements in attaining that goal.

On the training side he says that it is imperative that Airline Operators (AOs) must ensure that those responsible for flight planning correctly follow the standard procedures. Presently, some 80% of flight plans are processed automatically, which suggests that the remaining 20% are having to be resolved manually, which suggests that the remaining 20% are having to be resolved manually. Although CFMU manages to resolve these errors in the majority of cases quite rapidly, it follows that they do, in some way, contribute to delay, or the potential for delay. According to Byrom, errors in syntax are a particular problem and he suggests that AOs should ensure, to the fullest extent possible, that flight planning departments avail themselves of the latest and highly effective CFMU training materials in an effort to stamp out the problem. He adds that CFMU is considering establishing a league table of the best and the worst. The message, essentially, is that while the CFMU is there to service the needs of the stakeholders (AOs), so the stakeholders must take an element of responsibility if they wish to continue to receive the levels of on-time performance they have become accustomed to in recent years.
Communication between CFMU and Europe’s ATC providers, he says is good, but could be improved still further. The adoption of e-conference tools has helped immeasurably, but in some areas there is still no substitute for face-to-face contact. Membership of the European Civil Aviation Conference (ECAC) has grown exponentially. Naturally, the CFMU has had to absorb that growth and encourage those new Member States to adopt the practices that have long been adopted within the core of Europe.

Asked where the primary growth in demand on European airspace would come from in future years John Byrom highlighted traffic from the Russian Federation and China, as well as the continuing growth in low-cost operations throughout the continent. EUROCONTROL has already begun to experience a significant growth in traffic from the Russian Federation and, while data sharing is a challenge, CFMU works closely with the Russian ATC authorities to coordinate that traffic within the busy European skies. Given the explosive growth within the Chinese economy he sees additional and, quite probably significant demands being placed on the confined airspace assets of Europe, from the East over the next decade and longer. Low cost operations, particularly within the core area of Europe, also present particular challenges.

The message is a simple but, conversely, a complicated one. European airports, airspace providers and the stakeholders within the system have to get better and also more flexible if all parties are to continue to benefit from the continued growth in demand from the consumer base. Without continued enhancement and reform those who would benefit most from the continued growth in demand for air traffic services will ultimately loose out. Punctuality is important to sustained growth in the air transportation sector and the reduction of direct and indirect costs associated with freedom of movement to follow flexible, preferred and direct flight profiles with delay is highly desirable. EUROCONTROL’s Byrom says the CFMU can, and stands ready to assist, all stakeholders in that quest.
The Forum recorded high attendance with some 200 participants from 35 different countries, representing aircraft operators, handling companies, airports, air navigation service providers (mostly Flow Management Position managers) and industry.

The event has consistently grown over the years with more and more emphasis being placed on the operational systems, services and cooperation of the EUROCONTROL Agency partners within the ATM community. Evolving from an annual debriefing meeting for external CFMU users focussed on the evaluation of the developing CFMU systems through an open door-type of gathering, in recent years the event has developed into a Forum focusing on a variety of topics such as operations, general services and communication.

Currently 3,500 end-users are connected to the CFMU flow management system, which comprises 75 en-route centres (within which there are 450 ATC sectors), 84 flow management positions, 560 airports, 250 aircraft operators, resulting in a daily contact with 466 CFMU staff. Against this background, the opportunity to present directly to its customers the latest CFMU developments as well as the possibility to socialise and network with the participants is highly valued. CFMU User Fora therefore create an excellent occasion to share views, expectations and needs between the various customers and the CFMU staff and to look forward to further developments and interactions.

The main objectives of this year’s forum were to provide the participants with the opportunity to discuss specific operational issues with CFMU staff members and, where possible, to provide a demonstration of new functionalities available within the CFMU 11 release (the next software release to be introduced in spring 2006) as well as a review of ATFM operations.

The EUROCONTROL Director General, Víctor M. Aguado, welcomed the visitors, and the Director CFMU, Jean-Robert Bauchet opened the two-day event. The following presentations covered general trends in the fields of regulation, CFMU and DMEAN, airspace management and ATFCM measures, flight planning and airports as well as CFMU planning, organisation and communication issues.

Further changes in the CFMU 11 release covering Integrated Initial Flight Plan Processing System (IFPS), airspace data management, Enhanced Tactical Flow Management System (ETFMS), operational ATFCM procedures and CFMU Human Machine Interface (CHMI) were elaborated upon, together with clarifications on the overview of the operations situation, CFMU interface for aircraft operators, flight plan evolutions and operations, European AIS Database (EAD), On-line training and e-learning (WBT), operational ATFCM procedures, ATFM daily plan e-conferencing and RAD, e-RAD and NOTAM evolutions were presented.

All these presentations are available on the CFMU website at http://www.cfmu.eurocontrol.int/cfmu/public/standard_page/userforum_presentations.html
To assist the participants in sharing views and clarifying questions as well as to facilitate general interactivity, various documented stands with online access to CFMU services, were organised. These focussed on existing CFMU services and further ongoing development activities. Detailed explanations were provided in domains such as CHMI demonstration, flight planning operations, ATFM operations, EAD, airspace data and RPL, CFMU training, customer satisfaction survey, online CFMU services (registration/access, reporting/statistics, users documentation, claim handling).

This year’s forum was also an outstanding occasion to involve participants in the celebration of the 10th Anniversary of the CFMU.

In line with the CFMU quality standards, a couple of in-depth interviews were made to ascertain the customers’ views in relation to the 2004 Customer Satisfaction Survey. The feedback received from the participating CFMU clients revealed an overall 82% satisfaction rate, with the composition of the various displays and the networking with CFMU staff and also with the other participants during the event receiving higher than the overall satisfaction rate. Conference facilities and documentation and some presentations, such as RAD (Route Availability Document), also obtained a similar appreciation value.

Various suggestions for improvement were gathered and the CFMU aims to incorporate these in the future customised CFMU User Fora in its constant search for excellence.

Interaction, discussions, documented operational exchanges and further cooperation within the ATM community will remain the focus of the next CFMU User Fora.
**Navigation and Avionics Workshops**

4-7 October 2005, Toulouse

**Working together towards global implementation**

EUROCONTROL and the FAA co-hosted two very successful workshops entitled “Implementing RNP” and “Avionics for 2011 and Beyond” on 4-7 October 2005 at the Baudis Conference Centre in Toulouse. In parallel, a technical industry exhibition of navigation and avionics products and services (including the EUROCONTROL User Support Cell and OATA) was held and aroused a great deal of interest.

“Implementing RNP” was aimed at exploring future navigation developments from the present to 2025. There was strong support from all areas of the aviation industry, with over 420 delegates, and the global dimension was further emphasised by the attendance of participants from all over the world, including Russia, Japan, China, Brazil and Australia, to name but a few countries.

On the second day, aircraft and avionics equipment manufacturers explained their plans for future navigation systems and instrument procedure designers demonstrated interesting concepts for enhanced runway access. The final presentations showed the respective certification requirements on either side of the Atlantic Ocean.

An Open Forum constituted the last part of the workshop and was co-moderated by Alex Hendriks (Head of the Airspace/Flow Management and Navigation Business Division, EUROCONTROL) and Jeff Williams (RNP Programme Manager, FAA); delegates were given the opportunity to make their views known on the way forward to a harmonised and cost-effective deployment of navigation applications.

“Avionics for 2010 and Beyond” was aimed at exploring the growing integration of air-ground systems and, in particular, the relationship between operational concepts, architecture and research. This event was chaired by Dan Hawkes on behalf of EUROCONTROL and Ron Stroup for the Federal Aviation Administration.

The anticipated evolution of airborne systems was explored with the presentation of the “Avionics Study Report” developed within the framework of EUROCONTROL’s Overall CNS/ATM Target Architecture (OATA) Project.

The first three sessions emphasised the role of trajectory management as a means of evolving current ATM services. Several speakers talked of the need to negotiate trajectory information in order to ensure common understanding between air and ground systems. The remainder of the final session on Research and Development focussed on the emerging role of ASAS in delivering benefits within the operational concept.

The workshop demonstrated that future concepts require global cooperation in order to ensure that interoperability is achieved. Aircraft fly around the world and need to operate in diverse types of airspace. In order to do so in the future, as air-ground integration increases, global agreement will be required on the expectations and requirements placed on the airborne elements of the overall ATM/CNS system.

The feedback from delegates will be used, through cooperation between EUROCONTROL and the FAA, to review their strategies to achieve the benefits sought by the aviation industry. This task presents a considerable challenge. However, it was encouraging to note the willingness of all parties to work together to achieve ATM benefits in cost, capacity, efficiency and environmental terms.

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1. Required Navigation Performance
2. Overall CNS/ATM Target Architecture
3. Airborne Separation Assurance System
The objective of the safety R&D work package of the CAATS project is to gather and disseminate emerging good practice information on safety R&D conducted by the aviation organisations in Europe and to identify gaps and user needs. Despite previous reviews of safety R&D in European ATM (e.g. via ARDEP), it remains a fragmented field of research, one for which it is difficult to gain a coherent picture.

The approach in this work package was therefore to establish from researchers and stakeholders alike, what research was taking place, and what were seen as the priorities for ATM. This entailed carrying out a detailed survey of the European ATM Safety R&D community. Thirty six interviews were carried out in sixteen countries, in which forty three persons from thirty two ATM-related European organisations were interviewed.

The Safety R&D survey team was NLR (the Netherlands), ISDEFE (Spain), Boeing Research & Technology Europe (Spain) and the EUROCONTROL Experimental Centre.

CAATS Safety R&D Workshop

The Workshop had two main objectives:
- to identify safety research needs and priorities in order to improve coordination and collaboration on key European ATM safety R&D issues;
- to disseminate and promulgate the identified up-to-date CAATS best practices on safety methodologies.

The Chairman of the workshop, Dr Barry Kirwan, Safety R&D coordinator, EUROCONTROL Experimental Centre, and Morton Jensen, European Commission Directorate General for Energy and Transport, opened the workshop. Mrs Mariken Everdij, NLR, presented the results of the R&D survey and this set the context for the remainder of the Workshop. While the complete results of the survey will be published with the final report, four main directions were identified in which harmonisation and coordination on safety R&D can be improved:
- Centralisation of the coordination of safety R&D, through an independent focal point.
- Creation and maintenance of a common database on who is doing what in ATM safety R&D.
Large research projects should have shared objectives and have safety as a priority.

Safety R&D organisations should learn from each other.

Stakeholders including regulators, air navigation service providers, aviation safety R&D organisations, Aviation Safety Departments of Universities, Professional and Trade Union organisations and the United States FAA, all had the opportunity to present their identified current, mid- and long-term safety R&D needs, as well as setting out their views on the best ways to meet those needs through current and planned activities.

On the second day, the participants broke out into a number of training seminars which allowed participants to develop an understanding of various safety processes as follows:

- How to carry out a PSSA.
- Human error identification using task analysis, HAZOP and TRACER.
- The JSSI/FAST hazard identification and management process.
- TLS application to safety cases in ATM.
- The TOPAZ risk assessment methodology.
- How to conduct a human factors case.

On Day 3, a number of brainstorming sessions were held with the objective of (a) bringing together the main threads of the Workshop activities and (b) providing indications as to the way forward. These ‘mini’ workshops had the following themes:

- R&D development process – identifying the changes we want;
- Key safety R&D areas – developing the capability to change;
- Organisational framework – making it happen.

The output from the sessions is currently being summarised into a Workshop report, and as with all CAATS material, will be available on the website at www.CAATS@isdefe.es.

Conclusions

The feedback received from participants was very positive. The Workshop gave the ATM safety R&D community a welcome opportunity to come together and to share not only experiences, but also concerns and hopes for the future. The Workshop was not an end in itself, but is seen as a path on the road to better coordination of ATM safety R&D activities, leading to the common goal of enhanced safety of ATM and aviation to the benefit of society.

The way forward is to finalise the key areas for safety R&D collaboration in European ATM, and then present these to the European Commission to consider in the 7th Framework Programme. This should then lead to future resources in this area being focused on the right issues, in the right timeframe, and with the right allocation of competencies in the R&D community. This will maximise the benefits of safety R&D to current and future operational ATM.

Participating organisations:

ATC Maastricht is the most comprehensive event for the ATC/ATM industry in the world. The 2005 event will feature the exhibition, conference, workshops, round-table sessions, seminars and many networking opportunities, including the ATC Maastricht Awards.

Benefits of attending:

Compare and source products and services from more than 170 of the most influential and dynamic global companies from all sectors of the industry

Keep up-to-date with the latest in industry technology and developments through product demonstrations and the free seminar programme

Learn from the experts at the ATC Maastricht 2005 Conference 'Reshaping ANS for the twenty-first century'

Debate the safety and technology issues with your peers at the Open Forum

Attend the free Workshops on DataLink and HMI

Network with over 4,000 industry professionals at a host of events open to all visitors

Expand your contacts and form partnerships

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Cockpits and air traffic control centres are usually closed places for the general public. Not many people get to see the exciting work that is done in either place. Even fewer get to see the implementation of new technologies such as data link, that are currently being deployed in air traffic management systems, both on the ground and in the air.

Here are some examples, as captured on a recent flight, of the data link messaging and the associated human-machine interface (HMI) that is currently being used in EUROCONTROL’s Maastricht Upper Area Control Centre, the LINK2000+ Programme’s Pioneer ACC, and in the cockpit of one of Spanish airline Air Europa’s new B737-800.

On the morning of 4 November 2005, as Air Europa’s flight AEA1312 progressed from Warsaw to Madrid, it was about to conduct the company’s first operational controller pilot data link communication (CPDLC) flight over the Maastricht area.

At the controls of the B737-800, Capts Jose Maturana and Jordi Manzano initiated the CPDLC process by logging-on to EDYY, the facility designator for Maastricht. The CPDLC connection was established and shortly afterwards the crew received a message CURRENT ATC UNIT EDYY MAASTRICHT CENTER which was sent to them automatically when the flight was ‘assumed’ and under the control of the Maastricht controllers.

Flying through the Maastricht airspace the flight penetrated three different Maastricht sectors and used CPDLC in each one.

**HANNOVER sectors**

CPDLC data link allows the uplinking and downlinking of ATC instructions and responses, and also of requests via text messages, between controllers and suitably equipped aircraft. The CPDLC messages themselves, on both the air and ground side, are generally composed and sent via a selection of preformatted menus and submenus. Like the SMS messages on your mobile phone, records of the exchanges [history], can be quickly retrieved and referred to by both controllers and aircrew.

In Maastricht, the state of a CPDLC exchange – whether it is ongoing, awaiting a response or closed – is also indicated by colour.

In this section of a screen shot, taken in the early stages of the flight, the aircraft is actually in the process of downlinking a request [Request FL370] to the ground.

Downlinks are indicated to the controller by the white colour in the radar position symbol, by the white callsign in the datalink window, by the white L at the beginning of the line of the message, and also by the use of the letter R in the text for the downlink [RF 370 above means Request Flight-level 370].

The history of previous CPDLC messages is also displayed here in this window, but these must be read from right to left to read them correctly. The last message for a type of dialogue always goes in at the beginning of the line for that type. For instance, on the Route line in this picture [second of the 4 lines, denoted by R] the CPDLC history for the flight so far reads:

- **DCT to NOR**  
  ([A controller uplink of a ‘Direct to NOR’ message])
- **WCO**  
  ([The aircrew WILCO response to this message])
- **R DCT KENUM**  
  ([Which is a pilot Request for Direct to KENUM])
- **UAB**  
  ([the controller’s UNABLE response to the downlinked route request])
In this screen picture, we are a little further into the flight (but in the second of the two HANNOVER sectors visited by the flight) and here we have a better view of the current Maastricht CPDLC controller interface, captured here as a message is being composed for uplink.

In this instance the controller has already selected the menu buttons for ROUTE, and also for TURN R (the submenu button for turning an aircraft a specified number of degrees to the right).

The controller is then presented with options for pre-set amounts for heading turns (5 degrees, 10 degrees etc.). He is here selecting the 5 degrees option, which was uplinked to the aircraft shortly afterwards.

To note, also, the text of the uplink message is also being displayed as it is being composed [beside the callsign in the top line]. This is checked by the controllers before the uplink is sent.

BRUSSELS sectors

In this last shot of the ground HMI we see the flight in the process of being transferred to REIMS.

The uplink instruction to CONTACT [REIMS] 132.390 is in progress.

This is shown by the light green colour of the aircraft callsign in the window, and the light green colour of the V at the start of the CONTACT line. The radar position symbol of the flight is also displaying light green.

Shortly after the WILCO to this uplink was received the CPDLC connection with the flight was terminated.

Since the flight is some way further on than in the last picture there is also some additional history in the window, including several turns, and a deliberate controller time-out [for test purposes] to another downlinked request by the aircraft.

On board

On board the aircraft the aircrew has its own airborne HMI for conducting CPDLC operations.

This HMI has several pages dedicated to CPDLC, so that the crew, as well as being presented with the uplinked messages as they arrive, can also access a log of previous CPDLC messaging for the flight.

The crew can see at a glance the CPDLC messages for the flight, and whether they are ongoing [OPEN] or closed [CLOSED / ACCEPTED].

They can also see whether the message was an uplink or downlink, what time the exchange took place at, and the identifier for the ground system [EDYY].

Benefits

The implementation of this new air-ground communication medium leads to savings in voice communication time and greater potential for a better workload distribution between planning and the executive controllers. The use of CPDLC also helps aircrew and controllers reduce misunderstandings that can sometimes occur with traditional voice communications.

Its operational benefits have generated considerable interest in the national media in Spain and a later flight, on 24 November, saw a Spanish Public Television (TVE) crew make an extensive on-board video and interview the pilots as they flew through the Maastricht airspace.

CPDLC implementation in Europe is being coordinated by EUROCONTROL’s LINK 2000+ Programme. CPDLC is scheduled for implementation in Germany, Switzerland, Italy, Ireland, Portugal, France, Spain and UK.

Pictures courtesy of Air Europa and EUROCONTROL’s Maastricht UAC
The Aerodrome Data Display (ADD) provides air traffic controllers with airport-relevant data ranging from weather reports to the status of navigation equipment and information on the runways.

The Digital Flight Strip (DIFLIS) system — the first of its kind — digitally represents the paper flight strips previously used on the touch screens in an improved form, resulting in a considerable increase in efficiency.

Voice communication between pilots and air traffic controllers, and between air traffic controllers themselves, is handled by a digital system. This is extremely fail-safe, and is among the most modern of its kind anywhere in the world. A digital voice recording system ensures that all radio traffic is recorded.

All aircraft and vehicle movements on the runways, taxiways and aprons detected by the ground radar and multilateration systems at the airport are displayed with the aid of the Airport Surface Movement Tracking Observation and Control System (ASTOS). This technology is another first for Vienna International Airport.

The tower has been brought into operation in phases. The aviation weather service, ATS Engineering and apron control services moved first. The air traffic control staff and aeronautical information service (responsible for pre-flight briefing, cartography and aeronautical publications) followed in mid-October. Finally, the approach control centre will be relocated from the Air Traffic Control Centre in the third district in Vienna in early 2006.

The aviation weather service provides vital support for the air traffic controllers, and thus for flight operations. Its systems are located at the top of the tower, under the cab. Efforts to achieve maximum accuracy in forecasts of storms and wind shear on approach and departure routes, and of runway conditions after rain, are increasingly central to local short-range and terminal weather observation, owing to their importance to controlling operational costs at the airport. The move to the new control tower and the all-round vision it provides will be a major advance towards holistic weather observation and improved forecasting of short-term weather phenomena.
On 17 November 2005, the Director General of EUROCONTROL, Víctor M. Aguado, together with Jacques Barrot, Vice-President of the European Commission and Commissioner for Transport, the European Commission and representatives from a wide cross-section of European industry launched a major programme to develop a European air traffic management Master Plan. Known as SESAR, this plan will accelerate the evolution of air traffic management, synchronise and integrate plans from research to operations and coordinate airborne and ground deployments.

The current European air traffic management system has improved substantially. Since 1999, traffic has grown by 15% while delays have reduced by 75%. However, with traffic predicted to double by 2020, Europe needs a programme that in the longer-term can deliver the increase in additional capacity that will be required while enhancing safety.

According to Víctor M. Aguado, Director General of EUROCONTROL, “this initiative is key to ensuring that Europe will develop an air traffic management system that can face the safety, capacity and cost-efficiency challenges of the 21st century.”

EUROCONTROL has signed a contract for SESAR together with a consortium of 30 of Europe’s leading airspace users, airlines, air navigation service providers, airports and manufacturing industry. This is the first time that such a grouping has come together to develop the future generation of air traffic management in Europe. EUROCONTROL brings to the programme its technical operational and institutional civil and military expertise.

Funding for the definition phase is €43 million. A second, development phase anticipated to cost in the region of €300 million annually. The definition phase is jointly funded by the European Commission under a Trans-European Network – Transport (TEN-T) scheme, and by EUROCONTROL.
By Edith Klapwijk, Member of the R4E Task Force

On Wednesday 30 November 2005, Mr Chris Lebeer, Chief Executive Officer of the European Foundation for Quality Management (EFQM), officially presented the EUROCONTROL Agency with the “Recognised for Excellence” Certificate.

This official ceremony took place after the reception of the feedback report produced by the EFQM Assessors. In this report the external Assessor Team present their findings on the Agency’s strengths and areas for improvement. In their introduction to the report, the assessors made the following statement:

“The aviation industry and EUROCONTROL are faced with increasing pressures, such as increased traffic, increased number of Member States, the need for increased efficiencies, and, in response to this, EUROCONTROL has undertaken a structured review of the extent to which its infrastructure and operations are appropriate in such a challenging environment. The shift in emphasis from a “public sector” backdrop to a more “business focused” environment has been managed in a deliberately systematic manner.”

The report is very positive in confirming the strengths of the Agency such as the elaborate stakeholder consultation process and it serves as a basis for further improvements for the functioning of the EUROCONTROL Agency. All improvement actions will be incorporated in the overall Agency Improvement Action Plan outlining its Roadmap to Excellence.

The Champion Director for Excellence, Mr Massimo Fusco, opened the ceremony with a tribute to the full participation and support of all EUROCONTROL staff, especially those who, back in 1996, have been the pioneers of Excellence in the Agency. Their vision laid the foundation for today’s achievement.

The Chief Executive Officer of EFQM, Mr Chris Lebeer continued with praise for EUROCONTROL as one of the most proactive public sector organisations in the EFQM membership. He stressed the importance of the Organisation’s role in the European network for the deployment of sustainable excellence and looked forward to further achievements in the coming years.

The Director General of the Agency, Mr Victor M. Aguado, closed the ceremony with the following words:

“We are proud to be the first European intergovernmental organisation to be fully “Recognised for Excellence in Europe”. This is an acknowledgement of both the way we conduct our business and the results we deliver. Above all, it reflects the great effort and professionalism of each and every one of our staff members. This is a milestone on our roadmap to excellence. I have set out our next target to qualify as European Quality Award finalist in 2008. I know it is a challenging target and that our Organisation is not perfect, but I believe we have now created the momentum to make a difference in European aviation.”

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EUROCONTROL’s Journey to Excellence

1996
The Agency Quality Group (AQG) is created.

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1997
The Agency Quality Policy is signed by the Director General. The Agency becomes a member of EFQM.

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1997
Self-Assessment techniques are introduced in some Directorates. Overall progress remains variable throughout the Agency.

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2001
The Agency Excellence Policy is approved by the General Meeting of Directors (GMD). The Agency Group for Excellence (AGE) replaces the AQG. The Institute for Air Navigation Services (Luxembourg) takes the lead and is invited by the EFQM to participate in the R4E pilot. It is successful.

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2002
The GMD approves the cross-Agency approach to Excellence and sets a corporate objective to achieve the EFQM Recognised for Excellence award for the Agency in 2005. The Excellence journey is led from the top through the Agency Champion Director for Excellence (D/CRCO) and is coordinated by the Agency Group for Excellence AGE. All directorates now conduct annual Self-Assessments.

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2004
The First simulation of an Agency submission to become ‘Recognised for Excellence’ takes place. The Directorate of the General Secretariat (DGS) is the first Support Directorate to be validated as ‘Committed to Excellence’ by the EFQM.

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2005
On 3 November, a delegation of the Norwegian Civil Aviation Authority was received at headquarters for a visit of the CFMU operations room and a briefing on ATC safety and Single European Sky issues.

On 5 December, the Director General met Mr Michael Liapis, Minister of Transport and Communications of Greece. The Minister was accompanied by a delegation, including the Governor and the Director General of the Hellenic Civil Aviation Authority, Mr Stamatis and Mr Iliou, respectively. On 6 December the delegation visited the Upper Area Control Centre in Maastricht.

On 24 October the Director General welcomed Dr Christoph Franz, President and CEO of Swiss International Airlines. Among other topics, EUROCONTROL’s role in supporting airlines’ performance was discussed. The programme was concluded with a visit to the CFMU operations room.

On 4 October the German Armed Forces Staff College of Hamburg visited EUROCONTROL’s headquarters for an overview of EUROCONTROL and briefing on the concept of Flexible Use of Airspace, air safety and the short-term Dynamic Management of the European Airspace Network. A visit to the CFMU operations room was also part of the programme.
Forthcoming Events

- **14-16 February 2006**
  ATC Maastricht 2006

- **6-8 June 2006**
  ATCA-EUROCONTROL Conference & Exhibition, Brussels

- **27-29 June 2006**
  Global AIS Congress, Madrid

- **29 October - 1 November 2006**
  ATCA 51st Annual Conference & Exposition, Washington

The Spring 2006 issue of Skyway will focus on:

**ATM R&D**

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www.eurocontrol.int