

# OUTPUT

## EGATS

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EGATS OUTPUT



# DECEMBER 8TH 1998



For the first time, Maastricht UAC controls its 1 millionth aircraft in one year, a true milestone. It makes Maastricht the 2<sup>nd</sup> ATC centre in Europe when comparing traffic volume. Only three European centres have ever controlled over a million flights in 12 months time: Paris, last year (note that they have dropped well below 1,000,000 flights this year, because they delegated some sectors to Bordeaux). The other one is London, with some 1,700,000 aircraft this year, with around 1,000,000 of them operating in the London TMA.

But this is not the only performance indicator that shows off Maastricht UAC this year: in his report to the Provisional Council, the Director General quotes Maastricht as one of the rare centres in Europe that achieved the targeted increase in 1998. In fact, we've worked way too hard, since the increase achieved (10.9%) was actually more than double the target (5%). It might be hard to match such a performance ever again.

Despite this increase in traffic, delays have actually decreased (by 6%), something which only Budapest, Rome and Paris were able to do this summer. Others have had considerable increases, most notably

Brest (+533%), Karlsruhe (+135%), Geneva (+46.9%) and London (+44.9%).

The total capacity variation for the summer of 1998, compared to that of 1997, for Maastricht is 15%, only matched by Madrid (16%) and Rome (15%). Others have suffered considerable capacity decreases, most notably Rhein Radar, that was 26% less efficient in 1998 compared to 1997!

With all this seemingly bright and positive news about Eurocontrols' only leftover centre, it is highly surprising that little or no response comes from Eurocontrol when certain people, most noticeably from German administrations, make certain strong claims against the centre.

According to a Mr. Liedhegner, of the German Ministry of Transport, the rosters of Maastricht's controllers are 13% less efficient than the rosters in Belgium and Germany. A Mr. Kaden is allowed to openly state that Maastricht is 34% more expensive than an "equivalent German centre"...

First of all, both of these claims are not supported by any evidence. We say it is easy to say things like this, if they are not supported by facts. While figures for Maastricht are freely available, figures of other administrations (or companies) are far

from transparent. This can make a fair comparison between different centres very difficult indeed.

Secondly, while our rosters may be slightly less efficient than German or Belgian ones, neither countries can match the efficiency of the control room staff (according to the AEA report; see last issue). Anyone who thinks that by 'improving' current rosters by 13% (to match German "efficiency") we will be able to handle 13% more traffic is a total ignoramus when it comes to air traffic control (or human factors for that matter). Several reports have shown that maintaining a team system is slightly less efficient on paper, but this is well compensated for in work efficiency, as both our traffic and delay figures more than enough illustrate.

Thirdly, Maastricht UAC is allegedly 34% more expensive than an equivalent German centre, but one can ask the question: "which German centre would that be?" Surely, Mr. Kaden does not mean Karlsruhe, a centre which this summer REDUCED capacity by 26% and increased delays by 135%? If that is what they are after, I'm sure we'd have no problems matching that kind of "efficiency".

Fourthly, there is clearly a historical background that needs to be considered here: if Eurocontrol member-states had not betrayed the principles they agreed on when they

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formed the Organisation, namely the harmonisation of European ATC, Maastricht wouldn't have been in the isolated situation it is in now. In fact, sharing the resources between the different centres would have allowed a very efficient ATC system, that would have had no problems coping with today's demand: Karlsruhe has the only advanced flight plan processing system that is actually working in Germany. It was developed from MADAP, and aptly named KARLDAP. Ironically, it makes Germany one of the countries directly responsible for the failure of the good intentions. If they hadn't re-nationalised Karlsruhe, I'm sure the common centre philosophy would have had a fair chance in Europe and we wouldn't be in the mess we are in now!

Which brings me to my wish for next year (and the years after): all rambling and raving aside: If everyone would concentrate on solving their own problems rather than on trying to blame them on other people, we'd all be able to get on with our jobs. As it stands now, we're are forced to defend ourselves against unfair and unfounded criticism. And it's taking too much effort and time, which could otherwise be spend on doing what's important: providing a safe service to people who want to travel. Happy Holidays.

Philip Marien  
EGATS President

## THE 1999 EGATS ANNUAL GENERAL MEETING

Will be held on Thursday  
March 4<sup>th</sup> 1999  
at the usual venue:

Hotel Mercure at Beek-Aachen Airport.  
Meeting will start at 19.30h.

There will be vacancies for the Executive board. Anyone who is willing to sacrifice a few hours a month, please obtain a nomination form from the EGATS Secretary, Patrik Peters. This has to be handed in BEFORE Jan. 23rd 1999.

# Last Months' Editorial

In last months' Editorial, it was stated that Route Charges could be compared to a tax such as road or television taxes and that they had little to do with the actual financing of air traffic control. Lawrence Kelly, an EGATS member in the Central Route Charges Office in Brussels reacted to this:

"I would like to point out is that the Eurocontrol Route Charges System is not a tax. It is a cost recovery mechanism directly related to aircraft capacity, distance flown and cost of providing the services made available (the cost-base). There are strict, published, principles regulating what may and what may not be put in a national cost-base, such as the costs of ATC Centres, radar, telecoms, nav aids, parts of other services such as MET, as well as the aeronautical administrations themselves. Over-recovery or under-recovery has to be taken into account in future cost-bases, so there should not be any "profits" by the State concerned nor cross-subsidies.

The trouble is that many aircraft operators think of route charges as a tax, and some are actually convinced that all that money goes to Eurocontrol itself, or even to Maastricht! This is not the view, however, of the 80 big airlines who pay 80% of the route charges. With that much money involved, you can be sure they're better informed! And here's

another problem. The airlines are all represented by their user associations (IATA, IACA, IAOPA etc.) in all route charges high-level meetings (enlarged Committee, Study Group). These representatives are all present when estimates of costs are being discussed, and can (and do) challenge any apparently excessive rates. The fact that this awareness of how the system works does not penetrate to individual airlines is a reflection on the communication between these airlines and their representatives.

Which brings me to another "gripe", which is that the Route

Charges System often gets a bad name from Air Traffic Controllers as well. I feel that a bit more familiarity would induce some appreciation. Like the fact that we have a recovery rate of over 99.5%, a network of ATS personnel all over Europe processing archived flight data, and sending us messages on over 20,000 flight plans a day, and a dedicated team of flight data specialists here at the CRCO interpreting flight plan data and converting it into bills that the airlines can accept. In fact we could provide valuable feedback on flight plan accuracy since we have a pretty good quality check - if it's wrong, the airline won't pay! We're billing route charges under contract for 7 non-member States and are progressively taking on member States' Approach Charges. And last but not least - route charges pay controller salaries!

However, back to the point - what I would ask you to do is to just withdraw that comment about a tax (it is cost-recovery according to agreed principles and monitored by the airlines representatives) and with that I would be more than happy. If you want any further info on the mechanics of the money machine, don't hesitate to ask - or drop in next time you're in the vicinity. That applies for other EGATS members, if they're interested.

Best regards

Lawrence Kelly, CRCO"

Well, all I can say is that I'm sorry for adding to the confusion and distrust that exists against the Route Charges System throughout the operational world. I guess these days it is rare to find a service that is provided at net cost, and that misled me into believing (along with a lot of others still) that Route Charges are indeed a tax. I stand corrected. Thanks Lawrence.

Philip Marien  
EDITOR

# 10 Years Langen Academy Training Symposium

November 4<sup>th</sup> and 5<sup>th</sup> 1998, a symposium on Air Navigation Services Training was organised by DFS Langen to celebrate the 10th anniversary of the Academy. For EGATS, Ernst Vreede attended the forum. If you'd like more information, feel free to contact him (ernievre@wordonline.nl)

Mr Gerhard Diener, Head of Training, chaired the symposium and made it a very successful event. In this report a few presentations will be summarised. One interesting presentation gave a clear picture of how the pre-selection method used by DLR for DFS controller trainees can be improved. In his presentation Mr Hin-nerk Eißfeldt mentioned three pre-selection options:

- 1- application forms as used by Eurocontrol, the so called paper-sift.
- 2- adjustment of entry qualifications, to reduce the risk of failures during training.
- 3- a special questionnaire.

Option 3, defined as a **biographical questionnaire**, has three main properties:

- Self description of the applicant is used as basis material.
- Large sample analysis can be used to identify subgroups with different pass rates, e.g. TWR, APP and ACC/UAC.
- Possibility to adjust the stream of applications by means of empirical results (filter adjustments).

Analysis of the present situation reveals 4 main areas for improvement.

- 1- Low selection ratio (12% of the pre-selected applicants).
- 2- Large investment of resources to maintain the selection process.
- 3- High costs involved (over DM 100.000,- per candidate recommended for training).
- 4- Occasionally doubts in the meaning of university entrance level (Abitur).

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Trough simulation of filter-settings for data of 1992 and 1993, research on biographic data, studies on reliability of self-description etc. and a study on the use of biographic data DLR has made a proposal in 1993 for the use of a biographic data-questionnaire in 1996.

After a first sample of over 200 relevant questions from literature the questionnaire was reduced to 144 questions. Further analysis (CHAID, Chi-square-based Automatic Interaction Detection, used in commercial companies), experience and feedback has led to a "final" questionnaire (106 questions) and a machine-readable answer sheet. Possible applications for this method are: a reduction of the applicant pool varying from 17% to 50%; identification of 90% -100% of all recommended applicants. A reservation has to be made for the results (only valid for the sample under study (N>1200)).

So far the following conclusions can be drawn:

A reduction of 15%-20% of disadvantageous answers (content driven filter) is feasible, only ethical agreeable criteria are used and protected by in-house and out-house communication, a regular control of results is needed (unfiltered sub-sample every year).

DFS applied this method in 1998 for controller pre-selection and DLR was in charge of the scientific control.

To give you some figures: In 1998 already 1769 people applied for a controller job with DFS, 1284 would have passed the pre-selection phase without filtering, 485 were selected for the main selection after filtering. ~25% of the applicants have not been invited for testing due to the filter process.

The final conclusions were:

- 1- To establish a biographical questionnaire for filtering purposes large samples have to be analysed.
- 2- The described filter mechanism requires a continuous recruitment

process providing a surplus of applicants.

- 3- A thoroughly constructed biographical questionnaire can significantly enhance selection efficiency.

Professor Michael Kastner, University of Dortmund, gave a presentation on Psycho-physiological strain of ATCO's. He explained how several controllers were put to the test by questionnaires, simulations and interviews and how he came to a prediction and implications for selection and training. Apart from our own perception of stress and the mental and physical state we are in, he gave some interesting conclusions.

UAC controllers tended to be less stressed. There was no significant difference between other operational areas (TWR, APP, ACC). VFR traffic seemed to be more stressing than radar traffic.

Traffic volume and potential conflicts were confirmed to be the most important stressors.

In contrast to the simulations, interactions of number, conflicts and climbing/descending aircraft played an important role.

Professor Kastner concluded by listing possible ways of intervention by the organisation to reduce stress for the control staff.

1. Ergonomic mishaps should be reduced.
2. Sectors should be classified according to average traffic volume and probability of conflicts (by means of fast time simulation).
3. wages, working and break times should be fitted to this classification.
4. Active relaxation training and other personnel development programmes (self management, stress coping, physical education, etc.) should be offered.

The most enjoyable presentation was

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(Continued from page 3)

given by Andy Drain, Instilux. His CBT peptalk came as the cherry in the cocktail. He believes in Computer Based Training. One could say he is CBT. Heavily involved in CBT development he approached the subject, in a very humorous way, as the only way for future ATM training. He listed a number of benefits of CBT:

- one to one training
- can be done anywhere
- graphically rich and interactive
- reduces instructor requirements

Mr Drain highlighted three areas where CBT training in ATM can lead to a more efficient use of resources: Ab-initio training, System upgrade training and Continuation training

**Ab-Initio:** CBT can be used prior the beginning of a course, as an aid to classroom learning and for a staggered input of knowledge. In RADAR courses CBT leads to more efficient use of simulators and avoids "bulk" output. The cost per subject per person (1000 controllers per year over a 5 year period) is Euro 30, reduced to

Euro 20 for less packing and reproduction. The disadvantage is that the way we train may have to change.

Eurocontrol is developing EATCHIP Ab-initio subjects, an introduction to ATM and RADAR theory CBT modules. CBT packages will be available mid 1999 on meteorology, aircraft and principles of flight and radio navigation aids. These packages are available to all ECAC states, 5 copies per country. Additional copies cost 25 Euro each. Non ECAC states pay 200 Euro per copy.

**System Upgrade:** CBT is used or planned for most major projects. Obviously this is the way to train people on how to use computers. Low instructor requirement and easier scheduling will contribute to a cost benefit. CBT stimulates the exchange of experience.

**Continuation Training:** A scenario for Continuation training is: European wide training for controller preparation for the introduction of Very Large Aircraft.

Traditionally courses would have to

be run for trainers followed by trainers running courses for controllers. The advantage here is that you do not lose the human element. Disadvantages are time, cost and standardisation.

CBT would require the central development of one package followed by CD or Network distribution. In future this means a network-based delivery-standard, inclusion of an instructor via e-means and emergence of learning objects.

Mr Drain concluded that CBT does fit the new generation of students, is cost and time saving, does not create a decrease in standards but may require a re-think of our training organisation.

Ernst Vreede

# Hypoxia in Flight

## Introduction

Several accidents and incidents have occurred in which the aircraft's emergency oxygen equipment has been involved, some of the former with fatal results.

Many aircraft, in which the crew and passenger compartments are unpressurised, are capable of flight at altitudes at which breathing ambient air produces a significant and often critical deterioration in the performance of flight tasks. With pressurised aircraft, loss of cabin pressure at any altitude above 10,000ft will result in some deterioration, while at altitudes greater than 20,000ft there will be a very rapid impairment of ability unless oxygen is breathed directly the decompression occurs. Mountaineers and people living at significantly high altitudes may adapt to the rarefied air, but there will not be time for this to occur in the rapid ascent asso-

ciated with flight. This article is intended to alert all pilots to the dangers of Hypoxia (lack of adequate oxygen) and its prevention. Whenever altitude is referred to, this should be understood to mean altitude above mean sea level (AMSL). This is depicted by contours on ICAO standard topographical maps and will indicate, at the flight planning stage, those parts of a route where oxygen could be required.

## Physiological Considerations

The energy essential for living processes is obtained by the oxidation of complex foodstuffs, and thus oxygen is one of the most important materials required for the maintenance of normal function by living cells. The cells of the brain are particularly sensitive to lack of oxygen. Total cessation of the oxygen supply to the brain results in unconsciousness in 6 to 8 seconds and irreversible damage en-

dures if the oxygen supply is not restored within 4 minutes. The supply of oxygen to the tissues is normally maintained by blood which picks up the gas in the lungs and delivers it to the tissues. The concentration of oxygen in the blood leaving the lungs, and hence the supply of oxygen to the tissues, depends upon the partial pressure (molecular concentration) of oxygen in the lung gas which is closely related to the partial pressure of oxygen in the air inhaled. Although the concentration of oxygen in the air is constant at all altitudes, the partial pressure of oxygen in it, falls directly in proportion to the reduction of atmospheric pressure which occurs with ascent to altitude. Thus the partial pressure of oxygen in the air at 19,000ft (0.5 atmosphere) is about half that at sea level. Because of the presence of water vapour, the partial pressure of oxygen in air in the lungs is further reduced. However, the affinity of the red cells of the blood for oxygen, enables the partial pressure of oxygen in the cells of the brain to be maintained at half normal. At this pressure, the oxygen supply to the tissue is inadequate to



At the end of October Herman Detz and I attended the annual Nordic Assistants Association meeting, held in Oslo. Basically, the Nordic Association is a vehicle for information exchange and has existed since the seventies. Ever since it's inception the Association has had Assistants from Denmark, Iceland, Norway and Sweden as its membership. Two years ago it was agreed that the Eurocontrol Assistants could be admitted with Associate Membership. All this means is that we have no voting rights, not that voting is a regular event on the agenda. We were prepared to attend last year's meeting but somebody omitted to inform us of it!

During our three days in Oslo we got the opportunity to visit the tower at the new Gardemoen airport, which had opened just three weeks earlier. We were quite surprised to see that Assistants manned and operated the gate allocation positions in their own "tower" at about 80m elevation. The tower itself had just one Assistant position, and that was due to disappear in the not too distant future. Approach Control is co-located with the ACC which is situated about 30km to the south of Oslo and which we also found time to visit. The ops room is representative of 1980s thinking in that it is ensconced within a hillside, thus windows would be of little use! However, the atmosphere within that hillside is very relaxing and state of the art. The Assistant positions at the ACC would appear to be secure for the foreseeable future.

The Nordic meeting itself is based

upon discussion about the events that have taken place in the preceding year. It was pleasing to hear that the doom and gloom of the recent past seems to have subsided somewhat. Not that every Assistant sleeps well in his bed each night but at least the situation is beginning to look a bit brighter.

For some years now Assistants in Copenhagen have been manning the FIS position in the ACC and doing ground control from the apron tower. Both have been prized positions for the Assistants and thus it was felt that certifying the operating staff would remove their vulnerability. This has just recently been accomplished but unfortunately splits the Assistant staff into two very distinct groups; those who do and those who don't. The future for the Aalborg Assistants is very uncertain, although it is known that nobody will be transferred or dismissed.

Icelandic Assistants are optimistic that when the new system finally comes into service it will ultimately require the services of further Assistants. One Assistant has been assigned to the development of the new FDPS, which is considered to be a very positive step forward. Negotiations in respect of the licensing of Assistants had not proved fruitful.

The outlook in Norway is also very promising. The move from Fornebu to Gardemoen meant that the Assistants could expect some changes in tasks. However, these had not been finalised at the time of writing.

The Swedish Assistants have been

hit by the closure of briefing offices at Göteborg, Sundsvall and Malmö. The remaining office is located at Stockholm. A number of staff preempted the closure and moved to other jobs, both inside and outside the LFV. Discussion continues about the reduction of ACCs from three to two, but in the meantime the implementation of the new MATS system at Malmö and Arlanda in 2001 is expected to generate new duties for Assistants. Assistants still provide AFIS at a number of smaller airports throughout Sweden.

We offered Maastricht as the venue for the 1999 Nordic meeting but were not successful. As the English saying goes: old habits die hard. Only when we have full membership status can we expect to make a successful bid. We will however, try again at next year's meeting. That meeting will take place in Iceland in October 99 and it would be nice if we could send a delegation of four. It may yet be early days but anyone having an interest in representing their colleagues at next year's meeting should approach Herman or myself to be considered. Hopefully, EGATS and TUEM will provide financial assistance, as they very kindly have done this year.

Finally, I should like to take this opportunity to thank our Norwegian colleagues for their warm hospitality.

Paul Hooper.  
Herman Detz.

# Incident Accident Investigation

Once a controller or FDA in Maastricht is confronted with an incident/accident investigation, a lot of questions might arise:

- What is the correct procedure to be followed by the investigators?
- Who has access to the recorded data?
- Who is involved in the investigation?
- What are the rights of the individual subjected to the investigation?
- Should written statements be made?
- Can the outcome of the investigation initiate disciplinary measures?
- .....

Anyone who can answer all the above questions correctly with reference documentation, gets a free EGATS T-shirt – color of choice!

The EGATS Professional Committee has so far not found any strictly laid down procedures concerning incident/accident investigation within Eurocontrol and indeed Maastricht UAC. At least none that are complete or clearly state the rights of the unfortunate controller or FDA involved.

Recently, this was also recognised and the Safety Manager – R. Bartlett – was tasked with the production of a "Maastricht Safety Manual", which will identify all positions that are in any way related to, or connected with, safety.

Part of this Safety Manual will define procedures to be followed in case of an incident/accident investigation. These procedures will include the rights of control staff with regards to the incident investigation or more appropriately, the incident analysis.

The basic purpose of any investigative process is to determine what happened, why it happened, and what can be done to prevent a recurrence. The investigative process can

be more successful if controllers would not have to fear any disciplinary or worse legal action flowing from an investigative process they appear before.

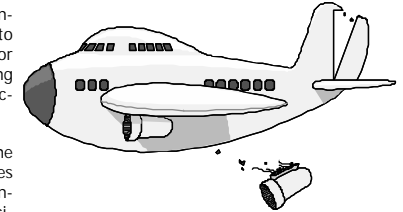
ICAO, in Annex 13 to the Chicago Convention, states that the objective of the investigation of aviation accidents or incidents shall be the prevention of future accidents or incidents, and that investigations are not in any way designed to apportion blame or liability.

In support of this philosophy IFATCA has produced policy on accident/incident investigation, in order that air traffic controllers can contribute fully to an investigation. As it currently stands, this policy is only aimed at controllers, but EGATS fully intends to include Flight Data Assistants in the final version for the Maastricht UAC.

The IFATCA policy concentrates on several key issues:

1. The right to be exempted from control duty following an incident or accident. This measure should be taken without prejudice and shall be non-disciplinary.
2. The right to be accompanied by a representative of his/her own choice to any hearing, investigation or inquiry.
3. Right to access all information that relates to the incident/accident, including all recorded material, transcripts and computer printouts.
4. Limitations to the use of recorded data.
5. Encourages voluntary air safety reports, if and only if immunity and confidentiality is guaranteed.

EGATS has passed on this policy – which we fully support – to the



Safety Officer, who will endeavour to integrate it in the Maastricht Safety Manual. A few adaptations to our local situation will be required, and EGATS has offered the Safety Manager its full cooperation.

Given the imminent introduction of the Airspace Safety Monitoring Tool, the need for a standardised methodology towards incidents is more pressing than ever. Hopefully the Safety Manual will in the not to distant future set well defined procedures for incident and accident analysis.

IV

**Reminder**  
Membership fee is  
**125 Dfl.**  
To be paid in **January**  
each year!  
EGATS bank account number:  
**46.86.12.254 (ABN-AMRO)**  
Non-Maastricht Members  
please contact your local  
Representative for details  
on how to pay your membership fee.

# A CHRISTMAS TALE

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As the dark, cold days of December 1998 came closer, the heart of the undaunted Air Traffic Control officer became gradually filled with joy and excitement. The reason was obvious. Because this year the merry-making Christmas season - already spreading an abundance of warmth, love and understanding among men - was to be precluded by yet another moment of festive mirth. December 10th: oh what a date to look forward to! The day on which controlling the one millionth flight within a single calendar year by the Maastricht UAC was going to be celebrated. A most appropriate and grand setting, for on the same joyful day he and his old comrades from the Ab Initio 5 course, would also reach the milestone of 25 years employment with the EUROCONTROL Agency. A point in time to commemorate properly, having devoted the best years of his professional career in helping to maintain the excellent reputation of the Maastricht UAC as the undisputed most productive ATC Centre by far in Europe.

In anticipation his beloved wife had brought his well preserved wedding costume to the dry-cleaners and had put a brand-new shirt and tie ready. Meanwhile he checked patiently day after day the contents of his locker, awaiting the official invitation to the ceremony in which the 25-year awards would be handed out by the Director-General. Alas in vain, although all of his A.I. 5 colleagues had already received their personal invitation well in time.

Many wakeful nights he wondered why. Had he been forgotten? Finally, in a desperate state of mind, the dedicated ATC officer knocked gently on the office door of the Director's secretary. He was referred to Human Resources for further information. There, an compassionate, yet firm lady disclosed the awesome truth to him. Her words in the dialogue struck him like a bolt from the blue:

'According to the Sacred Rules of Employment your actual day of 25 years in active service isn't due until 13 December....'

'Excuse me for being impertinent, but I truly started working for the Agency on 10 December 1973.....'

'Correct, but it seems to have slipped your mind that, back in April 1980, you have been away for three weeks on special leave due to a military training exercise for reserve officers in the Royal Dutch Armed Forces...'

'Forgive me again, but it was an obligatory call up in accordance with the national laws of a founding nation of EUROCONTROL. More-over, no temporary administrative measures had been executed at the time, such as withdrawal of salary or caisse-maladie coverage for my family....'

'Maybe so, but such a kind gesture by the Agency doesn't overrule the stipulations as laid down in the Sacred Rules of Employment. Sorry, but you have to wait for the next ceremony.....'

Dismayed, the loyal ATC officer crossed the dark, rainy parking lot in search for his car. Not only deprived of the privilege to join his old comrades in a upcoming award ceremony, he realised on top that, as a further consequence, his ETS and pension dates will also be three weeks later than anticipated. What a depressing preamble towards Christmas....

Then, all of a sudden, he saw the resemblance with a occurrence of nearly 2000 years ago. It was also December and it happened in the vicinity of Bethlehem. There, a young couple in joyful anticipation, seeking warmth and shelter amongst fellow men, was denied entrance to the inn where people had gathered. They also were sent away into solitude during a cold, dark evening by an act of inhumanity...

OK, the impact of both occurrences differed somewhat in magnitude. Nevertheless, the similar experience brought about a sense of melancholy and gratitude. Slowly the pain, caused by the cruel, relentless interpretation of the Sacred Rules of Employment, disappeared. He realised

that he was, in fact, blessed. There was something to look forward to after Christmas. A bright shining star that would lead him away from evil and towards to a glorious, harmonious future...

His heart and mind filled with joy at this perspective, the non-jubilant ATC officer started his car and left the Maastricht UAC premises to head for home. The guard opened the barrier and gazed at the tail lights, slowly disappearing into the night.....

### Epilogue:

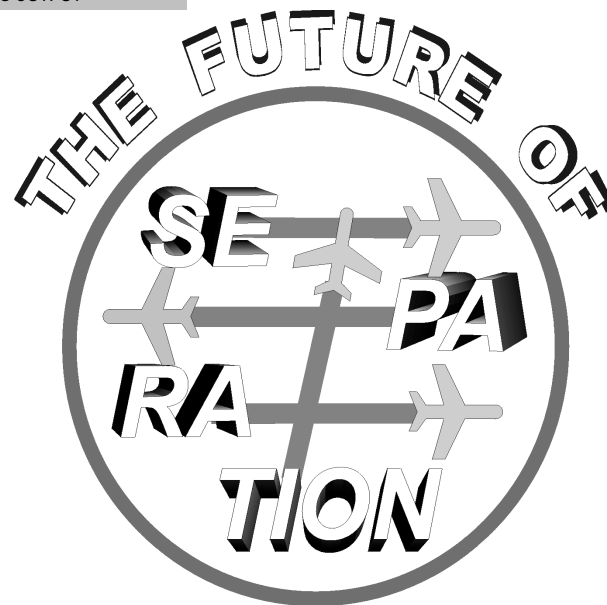
Hearing the outcome of her husbands' enquiry with the Human Resources Department, his beloved wife of the ATC officer persuaded him to write a letter and bring the matter directly to the attention of the Commander-in-Chief, residing at the Marble House in Brussels. After all, the CiC had promulgated repeatedly that 'our most valuable resource is our people'. And so he did.

Walking to the mail box that same night, the tired ATC officer noticed that the weather had cleared up. As the dispatch fell in the letter box he looked up and saw a beautiful big white star moving from west to east along the firmament. Assuring himself that it had not been the navigation lights of an aircraft under the safe control of his colleagues, he returned home with peace in his mind.

Two days later, the phone rang. It was the lady from Human Resources, inviting him cordially of behalf of the DG EUROCONTROL and Director Maastricht UAC to attend the celebration on 10 December 1998 .....

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## EGATS FORUM



23<sup>rd</sup> February 1999  
MECC MAASTRICHT/NL



**EGATS, the Eurocontrol Guild of Air Traffic Services, is organizing a one day Forum during the ATC 99 Exhibition and Conference in February 1999**

As always, participation in the forum will be free.

This Forum is supported by **Miller Freeman Exhibition Ltd., Jane's Airport Review, DENRO and Eurocontrol**

EGATS ATC 99 Forum Jane's Information Group, Sentinel House, 163 Brighton Road, Coulsdon, Surrey, CR5 2YH, UK  FAX +44(0)181.700.3715 Or +44(0)173.755.7503	YES! I would like to register for the EGATS Forum on February 23 <sup>rd</sup> 1999.
	Name: .....
	Job/Company: .....
	Address: .....
	City: .....
	Postal Code: ..... Country .....
	Tel: ..... Fax: .....
E-Mail: .....	

You can also register via [www.atcmaastricht.com](http://www.atcmaastricht.com)

# THE GREEK LIVING ATC MUSEUM

## 1950-1998(A.D.)

Once upon a time there was a beautiful place on earth, home of Zeus and Apollo... 6000 years ago, one of the most sophisticated civilisation started. They gave us philosophers like Plato, invented Democracy and built marvels like the Parthenon.

Eh ! What has this to do with ATC? Wait, this is Christmas, I am coming there..

The Greeks were also the inventors of Aviation. Yes, Icarus was the first aviator. The fact that he glued his wings with the wrong material and finally crashed is besides the point as those little technical problems still happen today (remember the tiles on the Space shuttle?)

Greeks today love their past and like to put everything in Museums. And why should this be different for ATC?

Greece built an ATC system in Athens around 1950 which was so sophisticated at the time that they decided to keep it intact forever, and operational even until today.

Imagine 5m long Strip bays (PHOTO 1) not used anymore but still preserved as they were... and with a very sophisticated telephone system linking all the other airports in the various islands with the Control Centre in Athens (PHOTO 2). Every handset has a different colour and ringing tone. As this system is non-

distributive (i.e. independent) only one telephone line can fail at any time, leaving the others fully operational. The system is so brilliant that they still use it today.

To talk to aircraft a modern telecommunication system was devised, and built underneath the consoles. To make it for easy maintenance and better cooling the wires connected the various boxes were left in the open below the consoles (PHOTO 3)

Proper temperature control of the

Ops room was provided by having the whole room surrounded by windows with easy to cover green curtains than can be freely open or closed depending of the temperature outside.

Later, much later, Post Classicism and Modernism made their inevitable entry: radar had to be introduced and they did this very carefully, taking much time to evaluate the consequences in the environment. They integrated the equipment with much taste, not wanting to disturb the general ambience and atmosphere in the place.

Thomson CSF delivered brand new SONY 2000x2000 colour radar screens during the first radar acceptance tests in 1996. But when the old Signal radars went U/S, the Greek Technicians mounted these new

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scopes into specially designed consoles that were to fit perfectly in the old environment.

This special design can be seen on PHOTO 4.

I have heard that they have been tipped to be among the finalists for the much acclaimed award of the best console design. It has so far been extremely difficult to integrate harmoniously new square radar scopes in a generally round environment, but one can say that this new art concept of raw natural materials, (sort of naked truth..) is very powerful indeed and adds to the purity of the line. It also fits beautifully with the rest of the Ops room...

On many Centres around the world today big discussions take place around integrating Voice Communica-

inter-sector co-ordination is done mainly using human voice, face to face, with a back up system using gesture exchanges, some of them very suggestive...

Integration of the initial radar surveillance equipment is done on the sector itself using minimum head movement (as demonstrated on PHOTO 5)

Staff working environment has not been forgotten. Very modern large personal lockers (for controllers to store their belongings) have been put at their disposal right behind the consoles, (PHOTO 6). Some of the doors have some difficulties to close today, but Museum authorities said this was adding to authenticity and felt in line with typical Greek hospitality to leave doors open...

A wonderful place indeed, and no wonder that they decided to keep it as a living Museum, because yes, everything is still used today to control traffic in 1998...

tions in a modern computerised environment.

In the Greek current system, which I remind you, was designed in the 1950's, both telephone, frequencies and inter-sector communications are independent of each other. In fact,

If you come to Athens, do not forget to visit the National Museum, the Agora and the Acropolis, but make sure to leave some time to visit the living ATC Museum at the airport. But hurry, rumour has that an Ultra-Modern, totally radar

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one...

Finally it has to be reminded that, despite all the odds with the old working environment, the Greek Air Traffic Controllers have always and still continue to provide a high standard of safety, excelling themselves in what they do, especially during the Summer peaks...and all this from a Museum...

DP

# GNSS IS COMING!

In October, a few controllers followed an introduction to Satellite Navigation. Developed by Instilux, the aim of the course is twofold: introduce operational staff to the technology and get some feedback of how controllers would interact with the system.

Changes to the status of the GNSS could have an effect over a wide area and can move in time and space.

The needs of the various components of ATM to have GNSS status information (whether predicted or in real-time) are not yet completely clear, and the question is being addressed by a task force which includes navigation, engineering and ATM expertise.

During two recent presentations which we made in Maastricht, some of these issues were clarified with the help of the controllers who participated.

We expect to repeat these presentations in the first quarter of 1999, so if you want to know more...

Paul Humphreys, EEC Bretigny  
Burhan Ocakoglu, Instilux.

The outcome of the ICAO FANS Phase 1 in 1988 produced a concept for Communication, Navigation and Surveillance (CNS) based largely on satellites.

Central to the navigation concept is the Global Navigation Satellite System (GNSS), comprising one or more satellite constellations.

GNSS will be able to provide a service suitable for navigation in en-route and TMA airspace, and for non-precision and CAT1 approaches.

Two constellations are already in place, the Global Positioning System, (GPS, United States) and the Global Navigation Satellite System (GLONASS, Russian Federation).

## European concerns.

These systems remain under military control, and their unrestricted availability to civil users in other countries is not guaranteed.

EGNOS (the European Geostationary Navigation Overlay Service) is being developed by States, European organisations (including EUROCONTROL) and industry, to provide GPS and GLONASS regional augmentation services to aviation, maritime and land users.

## Implications for ATM

It is to state the obvious that the GNSS differs fundamentally from other navigation systems, whether ground based (VOR/DME, DME/DME etc.) or aircraft based (INS, FMS).

## GNSS Slide

# IFATCA Regional Meeting

OSLO 13-15 November 1998

From November 13<sup>th</sup> to November 15<sup>th</sup>, IFATCA held its annual European Regional Meeting in Oslo, Norway. **Philippe Domogala** (our IFATCA Liaison), **Patrik Peters** (EGATS Executive Secretary) and **Philipp Marien** (EGATS President) attended the meeting.

The pressure within the European region to provide more capacity has reached an all time high. **IATA** heavily criticised the way traffic was handled during the summer of 1998, saying in various forums and press releases that despite the fact that traffic growth stayed within predicted margins, delays shot up by 25% or more. They urge everyone involved to do something about this, since the (usually underestimated) prediction of EUROCONTROL for 1999 is an 8% increase.

As a reaction, the **EUROCONTROL Performance Review Commission** tasked Bretigny to review the situation and to see what should be done to bring delays at the 1997 level. The result is no surprise: capacity increases between 5 and 15% everywhere. **Maastricht UAC** would have to handle **10% more traffic in 1999**, compared to 1998! Note that the report is a study on what SHOULD happen. The danger however exists that some people are going to see this as the target for next year. The report does not mention how it can be done, and this is where we (EGATS and most other controllers' organisations) have a problem. If no drastic changes are forthcoming, the increases mentioned are impossible to achieve for most people.

This is especially the case since no one seems to take safety as a factor anymore: Swiss controllers were given a target of 10% increase in 1998. Traffic only went up by 8.3% (much to the dissatisfaction of their managers) but in July 1998, they had as many incidents as in the whole of 1997! Something to think long and

hard about....

In the mean time, EUROCONTROL continues defining the **ATM2000+ strategy**. Linked to this and to the Revised Convention, **EATCHIP** is restructuring to fit within both the new EURCONTROL structure and at the same time accommodate projects proposed by ATM2000+. The conflict between Operational Tasks and Institutional-Regulating body seems to be stronger than ever before. This invariably leads to the conclusion that Maastricht no longer has a place within the EUROCONTROL structure and that some form of privatisation are imminent.

While the issue of training and licensing was only briefly touched upon in the HRT report, it is an important issue and we in Maastricht certainly have a definite interest in the matter. Since Luc Staudt is now working in Maastricht, we should use the opportunity to follow this a little closer.

The ATM 2000+ document itself seems to be largely in line with the IFATCA vision document (the federation has had quite some input), despite the fact that it makes some bold claims (sharing responsibility between ground and aircraft crew, using CDTI for example). The main question is one of realism and feasibility on the time scale envisioned: while the document details the strategy for the next 15 years, it does not mean implementation can be in 15 years from now! According to the chairman, Val Eggers, a mentality change is needed at all levels in the industry, from controllers to military, from pilots to dispatchers.

On to more specific issues: the meeting accepted provisional IFATCA policy on the introduction of **8.33 KHz** spacing in the European region (see elsewhere in this issue). This is inspired by the fact that the implementation seems far from flawless and the concern that at the time of introduction, the number of unequipped aircraft and the inefficient filtering at the border of the implementation area will cause huge problems.

**RVSM**: An incredible amount of work still has to be done, before the revised implementation date (should be announced last week of November). Delay in the introduction of TCAS v7 (15 months delay) could have its repercussion, as v6.04 is not workable in RVSM airspace. A lot of concern concentrates on the fallback procedures: what if RVSM has to be suspended (since it's introduction in NAT area, this has happened 28 times = ~twice/month). Capacity is **immediately reduced** (because of the FLAS, most levels go to 3000ft separation), it has immediate repercussions on adjacent units and a complex situation emerges in case of RTF failures!

All in all, IFATCA seems to be accepted at most levels as representing the professional interests of controllers, and is as such taken into account in most meetings. This is in itself a positive trend, but it also poses some problems: finding people to attend the ever increasing number of meetings becomes harder. Since attending these meetings is mostly on a voluntary basis, continued representation is far from assured.

As for individual MA reports: Most MA's report problems with the introduction of **new systems**. Quote from the Portuguese report: **"Apparently some of the experts of AIRSYS ATM are defecting, leaving the company in no position to comply with schedule at all!"**. The only exception to the rule is the Amsterdam system, which only suffered a couple of weeks delay. And, more importantly, controllers are happy with the system! Other problem most (western) MA's seem to have is one of staff (not enough of it).

BM



# R V S M - m i n i m a

## EGATS OUTPUT

Since RVSM is going to have a huge impact on operations in Europe, we bring you a historic overview, courtesy of IFATCA.

### 1. Historical Background to Vertical Separation

When the Procedures for Air Navigation Services Rules of the Air & Air Traffic Services (PANS RAC) and Annex 2 were drafted by Provisional ICAO ( PICAO) in 1947, Vertical Separation was defined as:

- A] Minima 1000 Ft (300 M) in all cases except
  - (a) Aircraft are being flown in conditions of flight visibility of less than 3 miles ( 5 Km) but not less than 1 mile ( 1.5 Km)
  - (b) Aircraft are holding above a well defined top of cloud or other formation during the hours of darkness if the pilot reports indicate the forward visibility is not less than 1 mile (1.5Km)
  - (c) Aircraft are on flight paths which will cross at or near a reporting point, provided that the aircraft concerned are using the same altimeter setting.
- B] No separation is required for enroute traffic above a well defined top of cloud or other formation if frequent in-flight weather reports indicate a generally unlimited ceiling or top and flight visibility of at least 3 miles (5 Km). During the hours of daylight, holding aircraft operating under these conditions will require no separation.

### 2. Establishment of the Vertical Separation Panel 1954.

Advent of commercial turbo-jet aircraft necessitated re-evaluation of vertical Separation Minima so a panel was formed in June 1954. Working initially through correspondence, eventually 3 meetings were held (1956-1958). At the second meeting the Panel developed a Circular on " **Provisional Acceptable Means of Compliance Testing of Altimeters**". The Air worthiness Committee updated this in 1965.

### 3. Rules of the Air, Air Traffic Services and Search & Rescue (RAC/SAR)

1958: Divisional meeting agreed that above some level there was a need to increase the vertical separation.

1960: Following consultations with states the ANC approved on applicable 1<sup>st</sup> August 1960:

Vertical Separation Minimum - The VSM between IFR traffic shall be a nominal 300m (1000 ft) below an altitude of 8850m ( 29000ft) or FL290 and a nominal 600m (2000ft) at or above this level ,except where on the basis of regional air navigation agreements a lower level is prescribed.

### 4. 4th NAT RAN Meeting 1960

Agreed that any reduction in vertical separation criteria must be viewed from the standpoint of safety rather than from that of the expeditious movement of traffic and that the problem inherent in reducing vertical separation of aircraft was not peculiar to the NAT region. The RAN meeting formulated in a " **Recommendation on Vertical Separation Criteria**" that , in view of the importance of Vertical Separation Criteria in the planning of ATS for the NAT Region, as well as for other regions of high traffic density, the work of the Organisation (ICAO) in the field of vertical separation be pursued vigorously to an early conclusion and be presented in a form suitable for early application in Regional ATS Planning.

### 5. Disbandment of Vertical Separation Panel

In 1963 the ANC concluded that effective progress was not possible pending the availability of supplemental information on static pressure systems and flight technical errors. It could take up to two or three years to collect this material and it was agreed to dissolve the VSP.

### 6. RAC/OPS Divisional meeting 1963

The Rules of the Air and Air traffic Services - Operations (RAC/OPS) established FL 290 as the level above which a vertical separation of 2000 ft was required world-wide and that this be reflected in a revised table of cruising levels. IATA expected that by the end of 1963 enough operational data could be compiled which could justify a reduction above FL 290 to 1000ft. The meeting formulated this as a recommendation: "That in view of the importance of vertical separation in the planning of air traffic services particularly in regions of higher traffic density and the desirability of reducing vertical separation intervals above FL 290, work in the field of vertical separation be vigorously pursued by all concerned to an early conclusion and presented to ICAO in a form suitable for early application in ATS planning on a world-wide basis, or, if this is not attainable at least on a regional basis."

IATA presented " Report on Vertical Separation Study" and distributed it to all ICAO Contracting States. The ANC decided in June 1964 to consult states which had participated in the Vertical Separation Panel but the predominant opinion appeared to be that the study did not prove conclusively that a reduction was warranted. The meeting was mindful of a Special NAT RAN meeting in Feb/ Mar 1965 where due for discussion was how to obtain a more efficient utilisation of the available air-

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## EGATS OUTPUT

# RVSM

(Continued from page 13)

space in the NAT Region. The ANC decided to revise its previous proposals to introduce an exception clause to permit regional determination of the subject.

### 8. Special NAT RAN meeting 1965

The meeting noted that considerable progress achieved in the production, installation, calibration and maintenance of altimeter equipment but it felt necessary to collect and evaluate more data before a definite decision could be taken. Four basic aspects required consideration:

- a) Definition of area of application
- b) Definition of measures to be taken by states and operators and development of necessary procedures in order to allow for application
- c) Definition of the data which would be required in order to come to definite decision on this matter.
- d) Establishment of a co-ordinated programme of implementation of the new minima.

The RAN meeting agreed the following recommendation:

"That States of registry of aircraft intended to be used for operation in that part of the NAT Region where 1000ft vertical separation is applied above FL 290:

- a) ensure as soon as possible that operators are taking all necessary measures for installation calibration and maintenance of altimeter systems( and air data systems, where used) and auto-pilots in accordance with the latest available methods; and
- b) assure themselves as soon as possible by means of flight tests, as appropriate, that calibration , maintenance and operating techniques used by the operators are such as to achieve the necessary degree of reliability and accuracy of altimeters (and air data systems where used) and autopilots."

And, "That States, whose State aircraft are intended to be operated in that part of the NAT Region where 1000ft vertical separation is applied, should be encouraged to ensure that such aircraft meet the technical and operational specifications established for civil aircraft so as to be also eligible for the application of 1000ft separation."

### 9. 5<sup>th</sup> NAT RAN meeting 1970

Despite the fact that much valuable information and data had been gathered the meeting failed to confirm that the introduction of a reduced separation above FL290 was feasible.

### 10. NATSPG : North Atlantic Systems Planning Group

This group was established at the Special Nat RAN meeting 1965 to plan for the implementation of new systems in the NAT Region. In 1966 & 1967 the group developed a mathematical assessment of safe separation. This was applied to the lateral separation to the NAT Region in 1968. At end of 1968 the group made a first attempt to apply a similar method to vertical separation but found that it was not possible to make a reliable calculation of the risk of reducing the separation. In the 70's and 80's, they concentrated on reducing horizontal separation. It closely monitored the work of **RGCSPP-Regional Concept of Separation Panel**. A big breakthrough came at 6<sup>th</sup> RGCSPP in autumn 1988. In May 1990 NATSPG established machinery to undertake the detailed planning required to implement **RVSM in NAT Region**. NAT Vertical Separation Group published a number of important documents the most important being " **Guidance Material on the Implementation of RVSM in the NAT Region ( NAT Doc. 002 )**"

### 11. RGCSPP - Review of the General Concept of Separation Panel

The study of vertical separation was added to its work programme at its second meeting in 1974, it aimed at determining the overall system error distribution and the magnitude and interrelation of the various component errors should be carried out in parallel as they were complementary in nature.

No major progress was achieved until RGCSPP/6 in 1988 - when it concluded that 1000FT vertical separation minimum between FL 290 and FL 410 was technically feasible without imposing demanding technical requirements on equipment. It concluded that significant benefits in terms of economy and airspace capacity would accrue.

The work of RGCSPP on RVS was virtually completed in 1990. It produced draft SARPS for various Annexes as well as draft amendments to PANS RAC.

### 12. The Limited NAT RAN meeting

This meeting agreed in 1992 to amend the NAT regional Supplementary Procedures. These were approved by ICAO Council March 1993 to become effective Jan 1996 and Jan 1997. To achieve the above time-scale, 90% of all NAT operators were required to be RVSM approved by Jan 1996 in order to begin the verification phase. The second hurdle was Jan 1997 when operational trials were to begin which meant that transition areas needed to be established, ATC systems needed to be modified and controllers and pilots needed training. Almost all the elements came together except for available service bulletins and the delays built into the approval process itself, which eventually led to a three month delay.

### 13. Phased Implementation NAT RVSM

March 1997	between FL310 and FL370
October 1998	down to FL310 and up to FL390

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#### 14. ECAC RVSM

While many lessons can be learned from the implementation of RVSM in the NAT Region due care must be taken of the many differing aspects between the two Airspace Classifications, the major ones being:

- (a) Greater Traffic Density
- (b) Greater mix of airframe types
- (c) Greater Military Activity
- (d) Greater proportion of Climbing and Descending
- (e) Airways and intersections
- (f) Greater Frequency congestion
- (g) Wake Turbulence - offsetting not available
- (h) Mountain Turbulence

#### 15. Latest timeframe proposed

January 1999 RVSM Master Plan for ratification at Provisional Council

November 1999 Regulatory Material prepared and adopted by States of Registry of aircraft intending to operate in ECAC RVSM Area.

June 2001 Report confirming that from a Technical Performance perspective it is safe to introduce 1000FT vertical separation in ECAC RVSM Area.

November 2001 1000ft Vertical Separation Minima is applied between FL 290 and FL 410.

November 2004 Confirmation based on the actual data acquired in a 1000FT VSM operational environment that the RVSM Implementation has met the agreed TLS.

#### 16. A draft document

The "ATC Manual for Reduced Vertical Separation Minimum (RVSM) in Europe" version 0.E is currently under review. All MA's should forward any comments to either E.V.P. Europe or the Representative for RVSM. There are many factors which must be tackled in order that a successful implementation is achieved. While many are identified, it will be the total wholehearted commitment of all the component parts that will assist in a successful and smooth introduction. Thirty eight States and sixty centres must achieve the final goal together and this in itself will require major coordination. Items which will need addressing are:

- (a) Staffing and Training.
- (b) Extra sectors to cope with increase capacity.
- (c) Airspace and Route Structure Modifications for Area and Transition Areas.
- (d) ATC Procedure changes.
- (e) FDPS (Flight Data Processing System) changes.
- (f) RDPS (Radar Data Processing System) changes.
- (g) Repetitive Flight Plan changes.
- (h) LOAs (Letters of Agreement) between Centres and Administrations.
- (i) Simulations.
- (j) SSR Code Assignment for increased capacity.
- (k) Extra Frequency allocations for extra sectors.

The demands of the above will place great strain on the present system as it tries to cope with all the changes necessary. The demand for extra staff will burden administrations as they strive to hold onto current staff who may be attracted to other centres while trying to recruit to overcome shortages. Unless all these factors are tackled in a programmed and timely manner well in advance by all concerned and the seriousness of committing proper resources in adequate time fully understood major delays will be inevitable.

EGATS OUTPUT

## RVSM

EGATS OUTPUT

An overview of the outstanding issues with the introduction of the new frequency spacing scheme, as seen by IFATCA.

# 8.33 KHz FREQUENCIES

During the ICAO-EURAN meeting held in Vienna in 1994, the European members of this body decided to tackle the lack of VHF-Frequencies available for ATC by reducing the channel spacing between VHF-channels from 25 kHz to 8.33 kHz for upper sectors. The experts present at this meeting thought that this decision would permit to Air Traffic Control to improve the worrying delay situation and to face the forecast traffic increase for the European region (traffic expected to double by 2015) until new technology (e.g. TDMA) becomes available.

Although all stakeholders were, and still are, in favour of swift actions to overcome the frequency shortage in our continent, they diverge quite significantly about how to achieve this goal. In analysing carefully the expert decision in favour of 8.33 kHz channel spaced radios, it becomes more than apparent that this STAND ALONE European solution is likely to bring many draw backs and operational problems that need to be addressed and solved before its implementation.

The Project Management for the 8.33 kHz implementation was delegated by ICAO to EUROCONTROL. Recent changes in the implementation planning indicate now that the carriage and operation of 8.33 kHz channel spaced radio equipment will become mandatory in the ICAO Europe Region (for flights above FL 245 generally, and FL 195 in France) by October 7, 1999. So far only States situated in the heart of Europe, where the VHF-congestion is at its worst, have indicated their intention to implement ATC-sectors with this the new radio equipment right from the beginning. Those participating states, or "8.33 States" are: Austria, Belgium, France, Germany, Luxembourg, Netherlands and Switzerland. The UK, initially part of the 8.33 States, has now delayed the 8.33 implementation to a much later date, certainly not before the year 2000.

Initially only the frequency band from 132.00 MHz and 134.80 MHz will be used for these new 8.33 kHz channel spaced radios, despite the fact that aircraft, and also ground stations, could use the whole aviation spectrum from 118.00 to 136.97 MHz. In replacing one 25 kHz frequency by three ATS frequencies with 8.33 kHz channel width, shows clearly the great advantage of this new technology. This means a significant number of new ATS-frequencies become available for air-ground communication.

Historically, the lack of ATS-frequency available was one of the major factors why capacity in Europe is so difficult to be increased in order to meet the expected traffic growth and minimising the delay situation. And this all without any decrease in safety. It has to be noted that Continental RVSM, expected to be implemented by the year 2001, where 6 additional flight levels will become available above FL 290, will only be able to reap its benefits of more capacity and user preferred cruising levels, if ATC is able to open new ATC-sectors with new air-ground frequencies controlling the additional traffic at these levels.

All other European States (ICAO European Region) are officially participating in the 8.33 kHz effort, although many will permit exemptions to 8.33 carriage in their national airspace as they believe that they can continue to provide ATC-service with the old 25 kHz-spaced frequencies they have at their disposal (of course they speculate to gain some additional 25 kHz-frequencies from 8.33 states). Exemptions to 8.33 carriage are either conditional or unconditional and are expected to be co-ordinated on an European level in order to avoid complications and confusion.

It is evident that in case such exempted aircraft are planning to fly into the 8.33 zone, they must either

fly around or below the 8.33 zone. It is rather disappointing to see that many European States, which were at the beginning playing the game in supporting the common effort of requiring 8.33 kHz-radios, are now starting to give in on pressure from operators and aircraft owners to weaken their position and to leave the 8.33 states alone. Some are showing less solidarity by giving exemptions at a very large scale so that the equipage rate will certainly be much lower than the 95% expected. This resulted, together with technical problems, in a 9 months delay. A safety validation study clearly indicates that the lower the equipage rate is, the greater the safety risks become in a mixed operation of 8.33 and 25 kHz spaced radios in the same region. Even States situated quite far away from the participating states and the actual 8.33 zone, and of course all neighbouring and adjacent states will be directly involved and concerned by this equipment change:

- change of ATC-frequencies (25 kHz) to vacate the frequency band 132.00 to 134.80 MHz
- "filtering" of non 8.33 kHz capable aircraft (descent before the 8.33 zone) to avoid accidental entry of these flights into sectors where 8.33 radios are used
- LOAs (Letter of Agreement) must be changed to handle these problems
- handling of State flights not equipped, and checking of 8.33 status on R/T for handover

IFATCA sees both technical and operational problems for the implementation of 8.33 kHz channel spacing in 1999:

#### Technical problems

- Quality of 8.33 kHz radios (speech quality and intelligibility)
- Interference to 8.33 transmissions (by aircraft systems, weather and environment phenomena)
- Frequency blocking by 25 kHz transmitters (3 to 4 frequencies at the same time blocked)

Although IFATCA, at its 1997 Conference held in Taiwan, was mainly critical about the technical issues of 8.33 kHz channel spaced radios, namely

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the poor speech quality was feared, confidence has been gained through several tests, e.g. BA in Bourne-mouth, that quality is probably at least as good, maybe even better, as the old 25 kHz technology (better filters with more stringent stability requirements). Despite this encouraging news, it remains important that some large scale tests in an operationally realistic environment are made by the actual users of the new system, pilots and ATCOs, to make sure that all is working safely as expected.

#### Operational issues

This is the field where EUROCONTROL, and also IFATCA, are working right now as many, many problems came to light that must be resolved before the 8.33 implementation can take place in 1999.

Basically speaking it must be ascertained that no aircraft that is not 8.33 kHz equipped is accidentally entering an 8.33 kHz ATC-sector. As mentioned in the 8.33 User Guide (Edition 3.0 is now valid) no 25 kHz back-up frequency will be normally available, and everybody knows that controlling an aircraft that is not able to communicate (hear and answer) with ATC is rather dangerous and difficult to handle.

An independent Safety Validation Group (SVG) was established by EUROCONTROL, using external transport experts from the UK, that had the mission to study and measure the safety risks of the 8.33 requirement. IFATCA was actively participating in this safety expert group and a Draft of the report is now available for consultation and correction. This study is part of a process called "MITIGATION" (reduction of risks) where recommendations to the individual States are made in order to take all measures and actions required in order to keep the risks and negative effects of 8.33 radios to an acceptable minimum.

During the safety validation process many hazards and issues that need to be checked and verified before implementation have been identified and studied. Mainly 2 different events are feared to create a real safety hazard: 1) entry of a non-equipped air-

craft into a 8.33 sector 2) Unplanned diversion of a non-equipped aircraft shortly before entry into a 8.33 sector. Despite the effort by IFATCA and other stakeholders from the operational field to keep this safety study as close as possible to reality, all indicates that it will remain a well intended "paper exercise" by independent safety experts that will be quite far from operational reality and there is a great possibility that its recommendations will only be partially followed by the individual states.

All ATCOs from participating 8.33

states, but also controllers from States adjacent to the 8.33 zone, are invited to be careful and vigilant in monitoring that their state its national administration is doing their homework and taking all measures and actions for a safe and harmonised implementation of 8.33 channel spaced radios in 1999.

### IFATCA Draft Provisional Policy on the use of 8.33KHz Spacing in the ECAC Area

*The problems that IFATCA foresees with the introduction of 8.33 KHz frequency spacing, have prompted the introduction of the following provisional policy. It is expected to be ratified at the IFATCA Annual Conference, in Chile in March 1999.*

**For safety reasons, the introduction of 8.33 KHz should not take place without 100% aircraft equipage.**

**For the implementation, the following conditions must be met:**

- Appropriate "filtering/gate keeping" procedures must be in place in the ECAC area and surrounding states.
- Detection of 8.33 KHz carriage by IFPS and the display of non-equipped status to the controller must be in place.
- Education programmes for pilots and controllers must be completed. This is particularly important in states surrounding 8.33KHz airspace which will perform the "filtering/gate keeping" procedures.
- Procedures which consider a controller as the principle means of mitigation are unacceptable.
- Last minute diversions and sub-versions of non-equipped aircraft will not be tolerated.
- IFPS shall not re-route automatically non-equipped aircraft.
- 121.5 cannot be considered as a contingency frequency for non equipped aircraft nor can it be used to re-route or divert aircraft that are not equipped.
- A 25KHz backup frequency must be available to re-route non-equipped aircraft
- Non-equipped medical flights will only be accommodated in the case of an in flight emergency.
- The introduction and use of 8.33 KHz spacing must be proven to meet at least the current target levels of safety. (i.e 25 KHz )

(Continued from page 4)

maintain normal function, and the condition known as Hypoxia arises.

#### Breathing Air at Altitude

The intensity of the hypoxia induced while breathing air varies with the altitude, the duration of the exposure and the rate of ascent. The other major factor affecting the intensity of hypoxia at altitude is the degree of physical exercise; exercise markedly intensifies the effects of a given degree of hypoxia. Finally there is considerable individual variability in the symptoms and effects of hypoxia. Generally, the higher the altitude, the more marked the symptoms. Rapid rates of ascent, however, allow higher altitudes to be reached before severe symptoms occur. In these circumstances, unconsciousness may occur before any or many of the symptoms of hypoxia appear.

#### Effects of Slow Ascent to Altitude

It is convenient to consider first the effects of slow ascent:

**(a)Flight Levels up to FL 100.** Seated individuals (unless carrying out heavy exercise) have few symptoms, apart from some loss of night vision. Their ability to perform most complex tasks will be unimpaired; however, the speed with which they can react to novel conditions can be shown in the laboratory to be impaired at an altitude of 8,000ft. The marginal impairment of performance produced in normal healthy individuals, by breathing air at altitudes up to 10,000ft, is considered acceptable;

#### **(b)Flight Levels between FL100 and FL150.**

Resting individuals have little or nothing in the way of symptoms, but their ability to perform skilled tasks such as aircraft control and navigation is impaired; the impairment increasing with altitude above 10,000ft. Individuals are frequently unaware of the hypoxia or of the impairment of performance which it produces. Indeed, they may well believe that they are performing better than usual. Physical exercise particularly at altitudes above 12,000ft frequently produces mild symptoms, especially breathlessness. Exposure to these altitudes for longer than 10-20 minutes often induces a severe headache;

#### **(c)Flight Levels between FL 150 and FL 200.**

Above 15,000ft symptoms of hypoxia occur even in individuals at rest. There is marked impairment of performance, even of simple tasks, together with a loss of critical judgement and will-power. Thinking is slowed, there is muscular incoordination and marked changes in the emotional state. Individuals may become pugnacious or morose, or may become physically violent. Again, they usually have no insight into their condition, an effect which makes hypoxia such a potentially dangerous hazard in aviation. Individuals frequently feel light-headed, with a tingling in the lips and limbs. Physical exertion greatly increases the severity of all the effects. It often causes unconsciousness.

**(d)Flight Levels above FL 200.** Breathing air at altitudes above 20,000ft results in severe symptoms even in individuals at rest. Mental performance and comprehension decline rapidly and unconsciousness occurs with little warning. In individuals seated at rest, the time between cessation of supplemental oxygen and serious impairment of consciousness is 10-15 minutes at 20,000ft, 2<sup>1/2</sup>-6 minutes at 25,000ft, 1<sup>1/2</sup>-3 minutes at 30,000ft. Any exertion at altitudes above 20,000ft rapidly produces loss of consciousness.

#### Effects of Rapid Decompression

The previous paragraphs describe the hypoxia induced by either slow ascent whilst breathing air or cessation of supplemental oxygen at a given altitude. The severity and rate of onset of hypoxia when it is induced by a sudden failure of the pressure cabin of an aircraft (ie time if decompression to above an altitude of 20000ft less than 1.5 minutes) is considerably greater than when the hypoxia is induced by cessation of supplemental oxygen at the same altitude. Thus serious impairment of performance will occur within 1.5 minutes following a rapid decompression whilst breathing air to 25,000ft. Oxygen breathing must be commenced within a few seconds of the beginning of a rapid decompression at altitudes between 15,000ft to 30,000ft if no impairment of performance due to hypoxia is to occur. Rapid decompression to altitudes above 30,000ft will result in transient impairment of performance even if 100% oxygen is breathed as the decompression commences.

## Hypoxia in Flight

These facts emphasise the importance of the correct use of oxygen equipment in the event of the decompression of a pressurised aircraft. This lesson is even more important in small pressurised aircraft where the loss of a window will result in a very rapid decompression of the cabin and hence the very rapid development of hypoxia.

It must be remembered that the effects of hypoxia outlined in the previous paragraphs apply to healthy, normal individuals. A proportion of passengers may be suffering, either knowingly or unknowingly, from conditions which reduce their tolerance of hypoxia below that of the normal, healthy individual. Heavy smoking has the equivalent effect of raising the altitude by several thousand feet. Individuals suffering from certain diseases of the heart or lungs do not tolerate well the hypoxia induced by breathing air at altitudes greater than 5,000-6,000ft.

#### Use of Oxygen

The hypoxia induced by breathing air (21% oxygen) at altitude is combated by increasing the concentration of oxygen in the gas breathed. Breathing 42% oxygen at 18,000ft (0.5 atmosphere) maintains the partial pressure of oxygen in the lung gas and the oxygen supply to the tissues at the same levels as produced by breathing air at ground level. The limit to the enrichment with oxygen comes when the gas is 100% oxygen. Breathing 100% oxygen at 34,000ft is equivalent to breathing air at ground level, whilst breathing 100% oxygen at 40,000ft is equivalent to breathing air at 8,000-10,000ft. Some form of positive pressure breathing or a pressure suit is required to prevent significant hypoxia above 40,000ft even when breathing 100% oxygen.

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# McBUG?!?

According to sources on the Internet, the world's largest hamburger chain will soon have to cope with its' own version of the Millennium Bug. As usual with the Net, we have no idea where it comes from, so we are unable to give credit to whoever dreamt it up.

"Experts warned today of a new and deadly threat to our beleaguered civilisation: the 100 GB bug. As most people know, McDonald's restaurant signs show the number of hamburgers the giant chain has sold. That number now stands at 99 billion burgers, or 99 Gigaburgers (GB).

"Within months or even weeks, that number will roll over to 100 GB. McDonald's signs, however, were designed years ago, when the prospect of selling one hundred billion ham-

burgers seemed unthinkable remote. So the signs have only two decimal places. This means that, after the sale of the 100 billionth burger, McDonald's signs will read '00 Billion Burgers Sold'.

"This, experts predict, will convince the public that, in over thirty years, no McDonald's hamburgers have ever in fact been sold, causing a complete collapse of consumer confidence in McDonald's products. The ensuing catastrophic drop in sales is seen as almost certain to force the company into bankruptcy. This, in turn, will push the teetering American economy over the brink, which, finally, will complete the total devastation of the global economy, ending civilisation as we know it and forcing us all to live on beetles."

## EGATS wishes all its members and their families a merry Christmas and a happy New Year!



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Lay-out  
Philip Marien

Scanning  
An Agfa<sup>TM</sup> scanner

Corrections  
The Microsoft<sup>TM</sup> spell checker. So please blame Mr. Gates for wrong spelling.

Printing  
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EGATS OUTPUT<sup>TM</sup> is published as soon as we get enough material together to make a decent enough looking magazine. Of this issue, 600 copies were printed and distributed to EGATS<sup>TM</sup> members.

The Small Print  
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