



the magazine of the EUROCONTROL GUILD of AIR TRAFFIC SERVICES

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PRESIDENT'S MESSAGE

— by Jan Gordts —

The readers of this magazine should know that on the EGATS' side a continuous effort is made to maintain a high level of quality: a dynamic but unfortunately small editorial team provides an adequate mixture of local and international news and a few authors assure the publication of various interesting articles.

Therefore external support is most welcome especially when this can enhance the outlook and presentation of the published material.

Input editor Bob van der Flier was proud to present to the EGATS AGM

(08.03.1989) the newly designed Input cover which could be introduced thanks to the kind cooperation of one of our neighbours, the ABN Bank - Maastricht Airport.

During the next Month EGATS will welcome the Marconi Company as a first corporate Member and we look forward to seeing their contributions to this magazine.

Hopefully more such contributions can be expected and we are confident that they will actively promote the understanding and cooperation with our partners in aviation.

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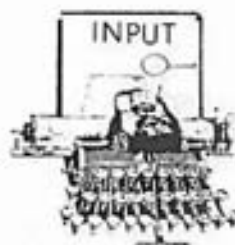
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EDITORIAL

by Bob van der Flier



....About crisis!

1. In February the Royal Aeronautical Society in London organised a conference with the attractive title: "How should we deal with the capacity crisis?"

I'll come back in more detail on this conference in our next issue of INPUT (Summer '89), but taken from this conference, let me just mention now:

- that there is more aluminium than concrete,
- that manufacturers can only produce the additionally required aircraft now and
- that therefore replacement production is not yet available,
- that the amount of firm orders for new aircraft is around 2.500 worldwide,
- that Europe as a whole has an international problem,
- that the politicians have more voters living around airports than among passengers,
- that the noise problem is a perception problem of having aircraft over your house,
- that aviation is a system composed of two elements (airspace and aircraft) and the balance between those elements is called capacity,
- that there is a problem of sovereignty on one hand and an environmental problem on the other hand,
- and, that last summer there was not only a problem of ATC capacity but in addition of ATC staffing.

The question of the future of European aviation is a European question, with shortcomings in the short-term as in the long-term.

EUROCONTROL is to construct a flow management system and with that, EUROCONTROL has to take the lead in European ATC. There has never been a 5 colonels' war, unless it was lead by a general!

Integration of the different national systems is needed in such a way allowing EUROCONTROL to take over that lead, step by step, thus over a long period of time.

Now we have the attention of everyone for this problem. However, we need to maintain this attention attracted.

Sofar a compilation of some of the remarks made, or lines taken from the different lectures at this conference in London.

One could say, generally speaking, that the conclusion was that the European problem can only be solved in medium to long-term, whereby in addition we should look to the very long-term.

Only through real European unity, will we come to an international European solution, solving the today's incapacibilities of the aviation system in Europe.

EUROCONTROL can and will play an important role, here in the coming decade (see the lecture by the DG elsewhere in next issue).

2. Another crisis is to come. Despite the goodwill described here above, there is still a serious problem to be solved in the heart of Europe.

A "Pacemaker" called CANAC will be implanted spring next year, it is said. The division with our downstairs neighbours will then be at FL 245. From the operational point of view this will be the worst possible division!

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In addition, CANAC has more sectors which means more personnel needed. However, the existing staff shortage, causing quite some delays already at regular intervals now, will certainly not be diminished by then.

Apart from that, this existing staff shortage will hardly, if not at all, allow for proper training and familiarisation on the new system, which in itself has hardly or not at all been simulated.

Add to that the present status of "mobilisation" of the ATC staff, which means that for the time being there is no communication between them and the authorities.

Is this an acceptable situation to provide safe air traffic services or is this a crisis situation?

3. Still about the downstairs neighbours. Can you imagine the crisis when the division level is raised to FL 300?

4. Let me finish with the good news:

a. The latest news from Spain is that negotiations resulted in a possible dispute free period for the years to come;

b. Here is another issue of INPUT, with some smashing interviews and big stories related to different fields of aviation and air traffic control.

WE, the very small editorial team did it again! Hereby I would like to highlight the amount of work on the wordprocessor by Carolyn.

BUT, I have to put a warning here: Without any input of the readers themselves, it will NOT be possible to maintain this level of INPUT.

Your membership of EGATS obliges you to be more active and participate more. Not only by reading!

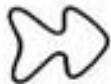
Hope to read from YOU next time. I count on your INPUT!

**don't
forget**

(WRITE IT DOWN)

NEXT COPY

DEADLINE: 1 JUNE 1989



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INTERVIEW with Mr. H. Flentje, former Director-General of Eurocontrol

At the occasion of his retirement after 18 years of service with EUROCONTROL, we approached Mr. H. Flentje with some questions for an interview.

We are now in the fortunate position to publish the questions raised with the replies received thereto.

I. You have been with EUROCONTROL for about 18 years now. When you entered the Organisation the ideas about a united Europe and thus about a European Organisation were different from now. What were your expectations 18 years ago taking up a function within a European Organisation?

F. 18 years ago I thought that due to the Commission's decisions to plan, build, implement and operation UAC's in Maastricht, Karlsruhe and Shannon and with the hope that from 1975 on France and the U.K. would finally transfer the tasks listed in the Convention, i.e. to execute ATC in the upper airspace to the Organisation, EUROCONTROL would become the European Organisation for Air Navigation Services in the upper airspace of the member states.

I. As a Director-General you will have met their politicians of the different EUROCONTROL member states. Their policies always have been the leading directives or the limiting restrictions for the organisation. Together with financial constraints the execution of operational tasks did not grow to an extent wished by so many of us. What could have been achieved if the green lights would have been given? (e.g. more EUROCONTROL UAC's in Europe, stripless environment, coloured scopes, etc.).

F. It would have been possible to create a European FAA responsible for:

- ANS in the upper airspace of the member states;
- planning and implementation of a real European ATC-system, with the development of common functional specifications, the operational and technical concept, and the EC could have supported us to develop prototypes of UACC's and ACC's with modern sector suites, data processing systems, a central flow system, modern data link capabilities, etc...
- cooperation and coordination with the FAA, and the USSR, to prepare ICAO standards and recommendations, etc...

It is the fault of the member states' administrations that we missed all these possible opportunities, and that we are at least ten years behind the times.

I. Do you expect that these missed opportunities will ever be implemented?

F. I believe so, but very late and only due to the enormous pressure of the flying public, the European parliament and all users in general. If EUROCONTROL member states do not start immediately with new ideas and the possible common effort, the EC will take over.

I. The year 1988 has been a tragic year for European aviation. Multihour delays, costly rerouting, hardly controllable congestion problems. For many years this situation has been predicted. It has been clearly indi-

cated on different occasions, that one day it will come to a situation like this. We are now faced with it. Recently decisions have been taken which should lead to an improvement of this situation. What effects will this have on the Organisations?

- F. The present situation was predictable; it is impossible and cannot continue, the users insist that everything has to be done as soon as possible, that the money will be made available, that a common, centralised flow control system will be implemented rapidly by EUROCONTROL and the 12 national flow management units be reduced to an absolute minimum. All ECAC-Member states have agreed to my proposal that EUROCONTROL be used as the forum and the Agency as the tool for all air navigation subjects and that the effort be concentrated there to achieve improvements as soon as possible. This was fully supported by ICAO.

- I. A more pertinent question related to the situation of the air traffic control staff in the Maastricht Centre; for many years now we had to accept certain constraints leading to a situation of decreased social conditions and human and environmental working conditions. Although EGATS is not a Union type of guild we are concerned about these factors influencing morale and flexibility of our members. Thus the following question: Do you foresee in the near future any improvements in this respect?

- F. We have tried to change this, and we are continuing to do so. I hope that member states will soon agree to the early termination of service under conditions acceptable to you, and to a career structure which meets your ideas, but they will not give more than they have negotiated with their own staff.

- I. We don't want you to attempt crystal ball predictions, but in view of the rapid changes in demand in aviation these days, how do you see the future development of the Organisation and the Maastricht Centre?

- F. UAC Maastricht will continue to play an important role in future for the whole Organisation. It is a pilot centre for all member states. We have had long and detailed discussions in the past about this very question and finally the member states have accepted the following text of the preamble of the future Maastricht agreement which is in the process of ratification by the parliaments of the four states:
"Maastricht UAC is a EUROCONTROL establishment for the purpose of

GARDENCENTRE -
LANDSCAPE GARDENING -
LAYING - OUT AND MAINTENANCE

arthur speetjens

FROM OWN NURSERY:

- Conifers, all types
- Shrubs and climbing plants

EXTENSIVE ASSORTMENT:

- SODS
- All types of heather
- Roses

LAYING-OUT OF TERRACES:

- Peat, manure and fertilizer, etc.
- Gardenhouses
- Greenhouses
- Renovation of existing gardens
- Plowing and harrowing



Geverikerstraat 11 (Geverik) Beek
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providing the Organisation with the essential link between the mandatory tasks in Art. 2.1 of the EUROCONTROL Convention and the practical execution of ATS, thus enabling the Organisation to maintain and develop its technical and operational know-how in the ATS field".

- I. Our first question was: What were your expectations entering the Services about 18 years ago. If you look back now on these 18 years, what are your feeling now and were your expectations fulfilled?
- F. We have had to go through very bitter periods and my expectations were not fulfilled at all, but if you compare the situation of 54 years ago with that of today, it is quite different. We now have 9 member states, Turkey, Malta, Cyprus, Italy will come soon, Spain will join,

in the end you can expect perhaps as many as 22 states as members, and in addition I have put on the table of Ministers a cooperation agreement which the USSR wants to sign with EUROCONTROL as soon as possible. This is the result of two missions we made to Moscow this year.

So this year has been a very successful one for us, and I believe that EUROCONTROL has a very challenging future.

- I. I wish you all the best for the future and we hope you will be able to spend them in the way you prefer. Also we do thank you for the good cooperation and understanding during the past years. Finally, we would like to thank you for your participation in this interview.



EGATS MEETS NEW DG

On 11 January 1989 the new DG, Mr. Keith Mack visited the EUROCONTROL Maastricht UAC.

Apart from getting acquainted with the Centre, its people and the different departments and their way of working, the programme contained a meeting with the different Staff Representatives.

In this respect there was a meeting between the EGATS EB and the new DG, together with the Director of the Centre, Mr. Stalpers, the Head of Administration, Finance and General Services, Mr. Drost and Head of Personnel Section, Mr. Klijnstra. Your INPUT Magazine editor was present as well and reporting:

After the formal introduction EGATS president Jan Gordts gave in a brief presentation an introduction on EGATS.

As the ATC background of the new DG was confirmed, the understanding of the presentation by the new DG was quite simple and recognised. This was felt immediately and gave opening to a relaxed and meaningful meeting. In respect of EGATS relations with

the Organisation, it was emphasised that regular meetings with the DG and the Head of the Operations Division in Maastricht are vital.

After the introduction by the EGATS President, Mr. Mack responded saying that he appreciates that professional aspects which differentiate a guild from a union. "It is the whole of the aviation scene". He underlined the need for a good communication and good relations with EGATS and immediate and prompt communications.

"ATC personnel have the expertise, their managers need them. Therefore they should work closely together!"

Continuing, the problem of the increase of traffic and its conse-

quences was tackled, together with the increase of training. Still it takes about 4 years of training to reach full validation.

Samples of EGATS Technical Committee activities together with the role played within IFATCA by EGATS were given. The absence of our IFATCA liaison officer, Philippe Domogala, due to the FEATS Conference in Paris was used as an example of the amount of time spent with these activities. Here Mr. Stalpers brought up the subject of the highly appreciated special leave granted to guild representatives partially compensating for time spent on these activities. It was underlined again that the amount of days allowed is in fact far from sufficient.

On the future activities for 1989, mention was made of the planned "soap-box" meeting in the second half of this year about "Future development of ATC", and of course the fact that on the initiative of EGATS there will be a DATA BANK EUROCONTROL (DBE) terminal available at the coming IFATCA Annual Conference in Frankfurt.

The minimum facilities at the disposal of EGATS were mentioned. The Director of the Centre stated that in the plans for the extension of the building, it will be taken in consideration that there should be adequate facilities for the Staff Representatives.

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Finally, the concern about early termination of service was explicitly mentioned by the EGATS Representatives. However, to avoid duplication this matter would be handled further by the Staff Committee Representatives in the meeting with the new DG following our session.

Furthermore, your editor had the opportunity to hand out a few copies of our INPUT magazine explaining the fact that this magazine is distributed world-wide.



The pleasant and open meeting was concluded by the presentation of an EGATS tie by EGATS secretary Kees Scholts, whereby Vice President Geoff Gillett indicated that EGATS membership is open to all staff holding or having held an ATC license. So is Mr. Mack!



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SYMPOSIUM

EUROPEAN COOPERATION IN AEROSPACE

A symposium was organised in Delft (Holland) on 1 and 2 December 1988 by EUROAVIA on the occasion of its 38th anniversary. A well organised, interesting symposium. Your editor reporting.

First of all, what is EUROAVIA? It is an association of European Aeronautical and Astronautical Students of the different universities throughout Europe. Their objectives are to further a close European co-operation in all fields of aeronautics and astronautics by establishing and improving contacts among aeronautical and astronautical students all over Europe and to give the members an opportunity to learn more about study, culture and industry abroad.

Founded in 1959 in Aachen, Germany, the association more or less vanished in the late seventies to reappear in 1984. Now, EUROAVIA has again proved its right of existence. New local and European activities, such as fly-inns, annual congresses, practical training schemes and study-reports, together with the publication of the EUROAVIA News, have been added. At present, 21 groups from 10 different countries form so-called local groups of EUROAVIA. It is hoped, they say, that through these activities the European aerospace student becomes acquainted with the culture and industry of other European countries, since this, in the present climate of European co-operation, should be an essential component in the education of aerospace engineers.

Since the programme of the Symposium was aimed at these students, the different lectures were, mostly of an informative nature and both civil as military related. There were representatives of, amongst others: Airbus Industrie, Rolls Royce Engines, Fokker Industries, ESTEC, Messerschmidt-Boelk-Blohm, DFVLR, FRG's Joint Airworth Requirements and Joint Certification (JAR), European Communities and EUROCONTROL.

Let's take some highlights of the different lectures and presentations.

From the European Communities, the Commission's Vice-President, Mr. Karl-Heinz Narjes, indicated that "the need for co-operation between European companies in major development projects and the production of aircraft has been recognised by the Commission for many years and the practise is now firmly established in the industry. The most obvious illustration of this is 'AIRBUS'. There has also been an increasing co-operation in research and technology but mostly on a national basis".

"We in the Commission", Mr. Narjes continued, "believe that the urgent requirement now is to broaden co-operation to Community level. With this in mind, the Commission recently launched an initiative aiming at establishing a strategic programme in aeronautics. The idea is to stimulate the European aeronautic industry to extend the existing co-operation to research and technology acquisition and to strengthen the technology base and broad front by bringing about more effective collaboration in precompetitive research".

"Two years ago the Commission together with the major European aircraft companies initiated a study on the future prospects for the industry. This study is known as 'EUROMART'".

"It foresees an increase of some 40 percent in real terms in the average annual value of aircraft and helicopter deliveries over the next twenty years as compared to the average value of delivery in the period 1980-'86".

"The Commission's plan is to establish a 'Strategic Programme for Aeronautical Research and Technology Acquisition' at Community level,

which should be put into operation as soon as possible".

"The Commission's view that action is needed, is consistent with the European Parliament's view expressed in its recent resolution on the European aeronautical industry".

Coming to the subject of space, the Commission's Vice-President continued: "Europe owes its position of the third most important space power to the existence and activities of the European Space Agency ESA".

With this remark about ESA we move to the lecture by the Director, Mr. Marius Le Fevre, of ESA's European Space Research and Technology Centre (ESTEC): "European Space on course to the 21st century". He referred to the decision by the ESA Member States to charge ESA with the simultaneous development of four new large space programmes. Mr. Le Fevre: "I consider it appropriate to emphasise this decision as unique and of historical significance".

"Although in the meantime the 4 new large space programmes to lead EUROPE into the 21st century have become fairly well known", they were briefly presented:

- Ariana 5 (1995), (together with Hermes) to give European autonomy in manned space flight;
- Columbus (1996-1998), the European contribution to the international space station;

- Hermes (1998), a delta wing space plane to be launched on top of Ariane 5 and capable of runway landings both at the launch site (Kourou, French Guyana) and in Europe;

- Data relay satellite system, to provide Europe with cost-effective and independent real-time space communication capability. Launches planned in 1996 by Ariane 5.

(We will come back to these interesting programmes and more about ESTEC later-on this year).

AIRBUS Industries' Manager Project Design, Mr. Georg Poschmann, presented a lecture on "AIRBUS Industrie and the European co-operation in aeronautics".

About production, he said: "The Airbus production plan shows an annual production of 84 A320 and 42 A300/A310 aircraft in 1990. After 1990 the A330-A340 production starts to build-up reaching 42 aircraft per year in 1993. Altogether the tentative baseline plan shows production of 158 Airbus aircraft in 1993, that is 2 aircraft every 3 working days. This means a tremendous effort for the whole Airbus Industrie's system and good co-operation between all participants is an absolute prerequisite to master this challenge".

"What has been achieved on the sales front? Up to the end of October 1988, a total of 883 firm orders for A300/A310/A320 aircraft has been received from 74 customers.



Out of these orders, 440 aircraft have been delivered up to now. To this number 151 commitments for A330/A340 have to be added plus all the options for the A300/A310/A320 which may be converted into firm orders subsequently. These sales figures represent a remarkable success for AIRBUS Industrie and especially the A320, which has got (645) more orders and options than any modern airliner at this stage of its programme".

Mr. Poschmann continued pouring out further interesting figures and information:

"AIRBUS Industrie and the US manufacturers agree that worldwide passenger traffic will grow, over the next 20 years, at a rate of 5 to 6% per year, which means almost three times as much airline traffic in the year 2006 as today. In addition, new aircraft will also be needed to replace old aircraft made obsolete by age, noise, high fuel consumption and cost as well as passenger appeal. As a result, AIRBUS Industrie forecasts up to 2006 a need for delivery of 9.200 new airliners (4.800 narrow bodies, 2.300 wide body twins and 2.100 3- and 4-engine wide body aircraft), of which we expect to get a share of approximately 3.200 aircraft".



Jumping to human aspects, the AIRBUS Industrie lecture read: "Another essential aspect in international co-operation is related to the PEOPLE, who are engaged in these activities at all levels. By nature, the participants who have to work together, come from different countries and environments and have a different education and professional training. Differences in respect to professional experience, approach to problems, reactions to events and management procedures, etc. are significant. To these can be added

the problems arising from living and working in a foreign environment, which create difficulties and challenges of language, civilisation and culture. These differences must be made positive. If proper and open exchange of views is not only made possible, but systematically organised, it is possible to increase the engineering quality and reduce significantly the risk of errors. Looking at a problem with different eyes and from different points of view enables us to understand it more completely and helps to find better solutions. In the past, neither the formal education system nor company training tried to prepare people in the 'art of international co-operation'. We just exposed them to the co-operative world and left it to the individuals to either find a way or drop out. But now the experience gained in international co-operation makes a more systematic training possible to complement the professional education. And this is one of the first and most important activities of EUROAVIA: To collect experience in co-operation and make it available to students and young aeronautical engineers.

Finalising this review of interesting subjects, I would like to mention shortly EUROCONTROL's Mr. André Benoit's lecture on "Efficient on-line air traffic handling".

"The fascinating, multi-disciplinary and presently critical field known traditionally as Air Traffic Control elicits a variety of acute problems, several of which comprise possible subjects of dissertations, thesis, research, development and applications of great interest".

"To illustrate the point, it will be sufficient to compare the level of automation attained in the aircraft and on the ground. In short, it is conceivable to fly in a fully automatic mode from departure to arrival, ground movements included, with or without a (monitoring) crew on board. In contrast, no system has yet been introduced in a ground based centre for the automatic generation of directives to assist the air traffic controller in guiding aircraft".

"The limitation imposed on air

transport demand by the present air traffic control capability on the one hand, and the developments in modern technologies on the other hand, make it possible to envisage extensive automation of the overall air traffic handling process in the course of the next two decades".

The lecture showed how "the present situation could be improved in terms of efficiency (economy, capacity and expeditiousness) and safety, by means of the integration of control phases over extended areas. The programme proposed represents an initial and essential step in the use of the computer to generate control activities at the decisional level".

The presentation included an overview of the Zone of Convergence (ZOC) concept and was completed with a video projection produced by the EUROCONTROL Experimental Centre

illustrating the "state of developments with the automatic generation of guidance directives, conducted in realistic conditions with the participation of professional air traffic controllers and airline crews".

Since this presentation, of high interest to ATC staff, was presented as well at the International Seminar "ATC 2000" in Luxembourg in February 1988, we will come to a full publication later (Ed.).

This will conclude this report on my visit to the EUROAVIA symposium in Delft. In total a very interesting symposium with high quality subjects and speakers. It therefore was a pleasure to have been a guest of EUROAVIA and I would like to express my thanks for their invitation.

Bob van der Flier.

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GARANTIEFONDOS
REISGELDEN

Nieuwstraat 19 6211 CR Maastricht

Telefoon 043-211451 Fax 043-252114

Hilde Taffner

Anita Germans



Stationsstraat 52 6221 BR MAASTRICHT

Telefoon 043 - 211515 Fax 043 - 212799

Til Maessen



'FASTER THAN A BULLET'

by Geoff Gillett

The Date	: 10 December 1988
The time	: 1040 Local
The Place	: London Heathrow runway 27L
The Aircraft	: G-BOAC
Concorde 001	: "Ready for take off"
Heathrow Tower	: "Roger Concorde 001, cleared for take off surface wind three zero zero degrees, one zero knots."
Concorde 001	: "Roger cleared for take off"
Captain (Intercom):	"Gentlemen, are we ready? Three, two, one, now!"

Four green lights indicate that re-heat is operating and 38,000 pounds of thrust from 4 Rolls Royce Olympus engines push me back in my seat behind the Captain, as the runway unwinds ahead of us.

Though frequently amazed at the circumstances in which I find myself, this was an experience beyond my wildest dreams - a member of the flight deck crew on Concorde - supernumary thought I was, I had received a full briefing, including evacuation procedures and had been made most welcome on this, my first and almost certainly my last, civil supersonic flight. There had been criticisms of course, about the distribution of these familiarisation flights, obtained by the EGATS Flight Department, after long negotiations with British Airways. Critics are never in short supply and finding a fair method of allocating these flights was, perhaps, more difficult than obtaining them. Flight department people had considered the problem extensively, concluding that a competition, requiring twelve answers to questions about the Concorde, independently judged by four members, would be a fair method. For me, this necessitated borrowing two library books, one telephone call

to BA and about seven hours work.

With the nose drooped, the take-off roll was exceptionally short, in spite of our being close to maximum take-off weight. After only about 16 seconds, we rotated and left the runway at 217 kts. and headed west towards Windsor Castle, clearly seen in a visibility of about 20 nms and 8/8ths blue sky. Noise abatement procedures necessitated power reduction after one and a half minutes and reheat was cancelled at about 600 feet. As the visor was raised at 250 kts., a controller's voice, with a London accent I though I recognised from years gone by, cleared us to FL 120, the after take-off checks were completed and we passed over Reading climbing on a radar heading at 5,000 feet per minute.

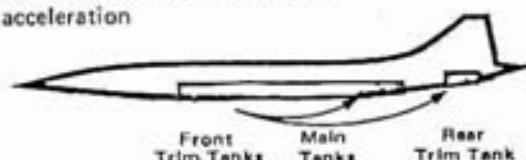
"Captain speaking" time had arrived and he informed his 95 passengers and 5 empty seats of our ETA, and that the weather in New York was dry and sunny. In terms of local time, we would all arrive one hour younger!

During the subsonic climb our rate varied between 3,000 and 6,000 fpm and no "level off" had been necessary. As the passengers sipped their aperitif, we slipped smoothly into the transonic phase of flight,

with reheat on. As Mach number increases, the aerodynamic centre of gravity moves rearward and the aircraft has to be re-trimmed. In Concorde, this is achieved by moving fuel around. For acceleration, fuel is transferred to the tanks in the rear fuselage and at the end of the cruise phase, fuel is moved forward again (See Diagram).

In Flight Fuel Transfer

Rearward transfer — transonic acceleration



Forward transfer — end of cruise



Fuel is also used for cooling purposes on the Concorde. The temperature on the nose reached 125 degrees Celsius, that is 175 C above the surrounding air and the aircraft "grows" in length by about 20 cms.

The airways controller gave several warnings of possible sonic booms to other aircraft in our vicinity and then cleared us for a cruise climb to FL 600. The flight engineer suggested I should watch the vertical speed indicator and the machmeter, since they would be the only indication that we were supersonic. Sure enough, the VSI started to bounce up and down as we went "though the sound barrier" but no bang, no flutter. No other sensation except a realisation that around FL 300, we were still climbing at about 3.000 fpm at more than 600 kts TAS. After about nine minutes, reheat came off at Mach 1.7 at about 43.000 ft. and the rate of climb gradually decreased to about 50 fpm by the time we reached the end of the supersonic cruise.

Prior to that, however, a young lady arrived with four trays of tasty snacks and coffee and having seen Mach 2.0 reached on the machmeter, only 40 minutes after take-off, it seemed an appropriate time to sample the passenger cabin. Walking at 2.000 kph through the fastest restaurant in the world, I was surprised at the relative smallness of the cabin -

about the same as a BAC 1-11 perhaps and with a not too generous seat pitch. There were several famous faces on board, pop stars and business men mostly. The meal was excellent and hardly had I become acquainted with my fellow passenger, a property tycoon from Australia, when we were in the descent from the brighter-than-usual blue fringe of

space. So back to the flight deck.

Although we had only a short time ago vacated FL 560, slight turbulence was experienced whilst the captain briefed me on the approach/missed approach procedures. Already the R/T was becoming busier with quickfire American phraseology, as seventy miles of Canadian coastline was slip-sliding away. Nantucket Island, Martha's vineyard and the Manhattan skyline were identified by the crew also Staten Island and the Statue of Liberty stood out against an azure blue sky. What luck to approach JFK for the first time, in such wonderful weather and in December too!

So fascinated was I with all there was to see, that my recollection of the approach and landing was minimal, except that the captain made a manual landing, greasing it onto the runway at 160 kts. From a passenger point of view, the whole flight had been uneventful. They are the best kind after all!

And so we were down. 3.605 miles in 3 hours 26 minutes - less time than it takes me to drive to Calais! So into the crew bus and an expedited check-in at the New York Sheraton with the rest of the crew, except the Captain of course!

Whilst all this had been happening, colleague Andy Barnby, co-winner of the competition, had departed Heathrow on a BA-747 about thirty

minutes after me and we had arranged to meet in the hotel. With only 30 hours stopover, I was determined to make the most of it. A quick shower, change of clothes and off to the Empire State Building, one hundred and twenty floors high and a total height of nearly 1,500 ft. (483 metres). Being such a clear day and the start of the Christmas shopping period, I had the impression that half of the population of New York wanted to see their city, the "Big Apple", from the observation platform at the top. Eventually, my turn came and what a wonderful view! I remained about an hour drinking in the effect of the Manhattan skyline, marvelling at man's engineering. It also occurred to me, that Mr. Barnby's B-747 was about halfway across the Atlantic. Somehow I wanted to tell somebody, anybody, that only six hours ago, I was walking in the streets of London, and only Concorde could make this possible. But who would have cared? But no time to philosophise, take one of the seventy-three elevators, at a speed of up to 1,200 feet per minute in the descent, back to ground level, with a right turn out and up Broadway, via Times Square, to see Carnegie Hall.

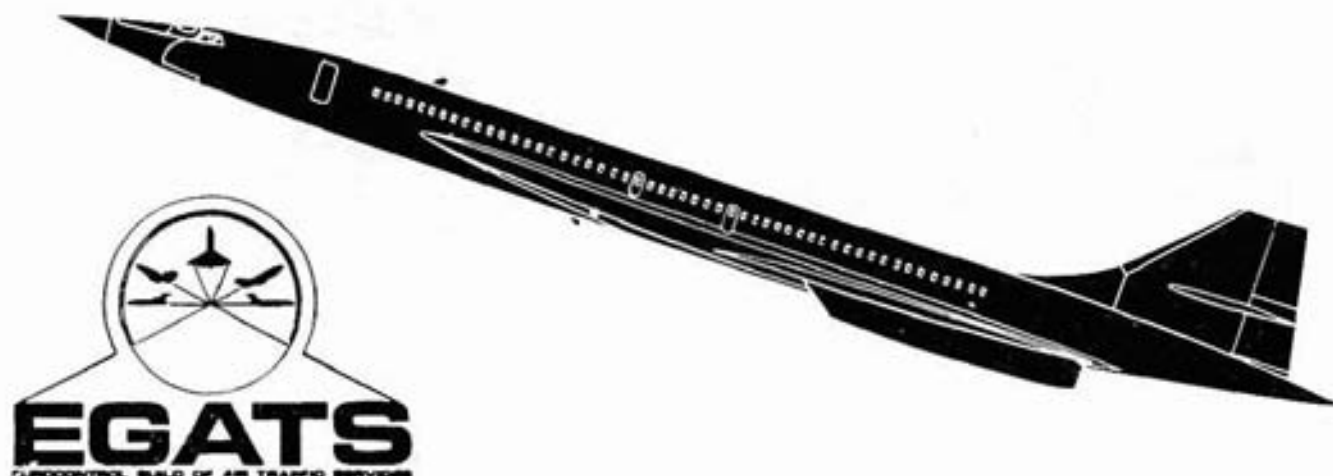
Is it really 50 years since Benny Goodman played his famous concert here? Is it only 85 years, 1 week and 5 minutes since Orville Wright made the first man-controller flight, lasting 12 seconds? Has Concorde really been flying commercially for more than 13 years? Doesn't New York look beautiful in

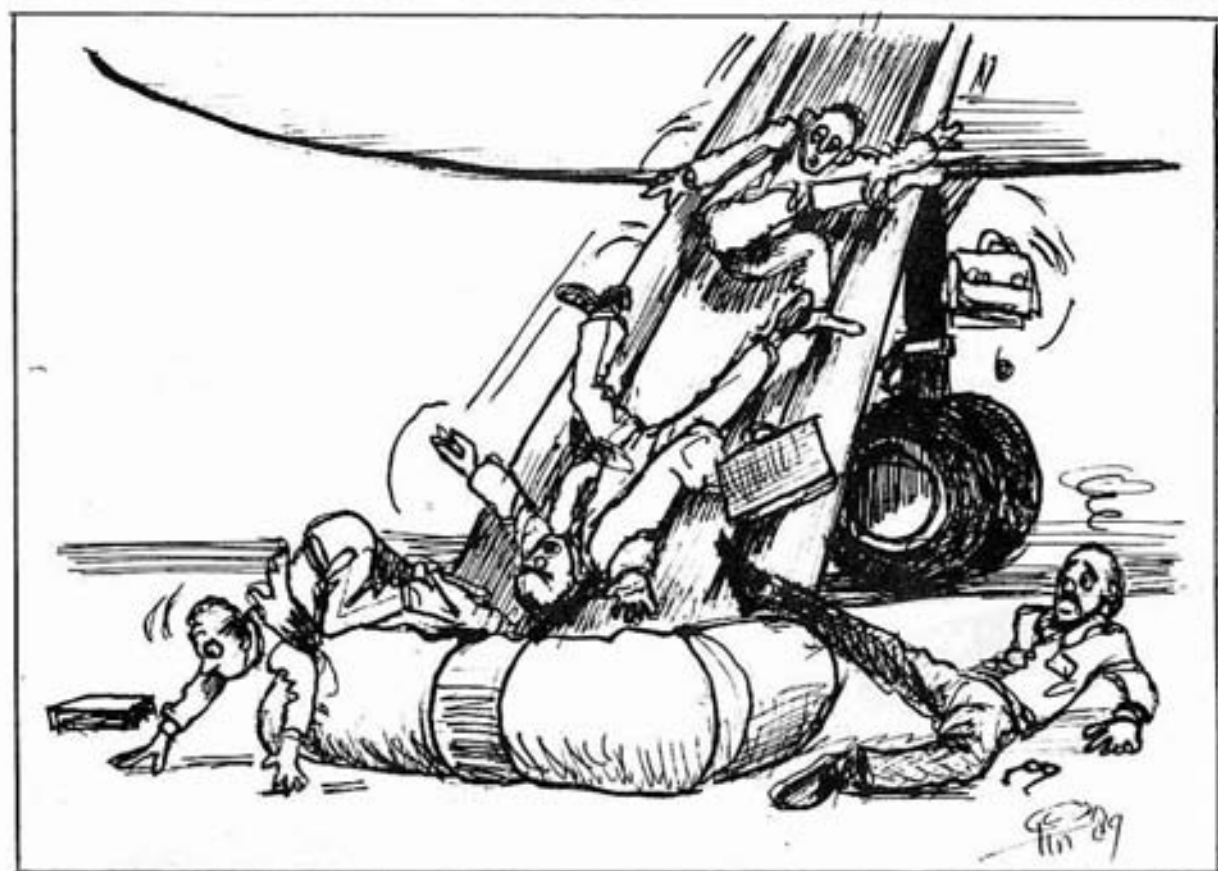
her Christmas clothes, trees everywhere and shop windows competing for attention! But it's time to return for our rendezvous at the hotel.

Good ATC planning! Mr. Barnby had arrived seconds before me and was having problems getting a room. Quick negotiations with Clyde, the concierge, a typically friendly American, who gives the impression that he has known you all his life, has no rooms available, so we share. We had both arranged to meet up with our respective crews, Andy with the 747 crew and I with the Concorde team in Houlahan's Bar.

Again a shower, change of clothing, and out into the now-freezing night air. The scene had changed. Millions of lights; traffic lights, neon lights, "Don't Walk" lights and moonlight. But walk we did - eventually to Houlahan's draught Guinness flowed and so did the conversation. Altogether, it was most enjoyable evening spent with these crews - the highest of fliers - talking aviation for most of the time. What a pleasure it is to have contact with fellow-professionals, whose working world we share but with whom we have so little contact! What a technical achievement to move 100 people at 1,340 nautical miles per hour - faster than the speed of a rifle bullet. A total - aviation experience!

My grateful thanks to British Airways, Captain K.D. Leney, Flight Manager technical, Concorde, the crews and to my colleagues in EGATS who made it all possible.





VISITORS FROM RUSSIA

In the last week of January 1989 a delegation of the Russian Civil Aviation Workers Union (CAWU) visited EUROCONTROL on an invitation of the Union Syndicale Maastricht Branch. Your editor reporting!

The CAWU is a union with over 1.000.000 members, mainly within the USSR. However, Russian aviation personnel stationed all over the world are members. The CAWU consists of about 2.000 different organisations comprising all aviation related professions, such as AEROFLOT personnel (from pilots to maintenance staff), ATC personnel, but also airport-handling staff in and outside Russia.

The delegation was formed by the President of the Central Committee of the CAWU, Mr. Alexander Gridin and the head of the International Relations Office of the Central Committee of the CAWU, Mr. Victor Finagin.

On arrival at Maastricht airport on Monday, the delegation was welcome by the hosting Union Syndicale representatives Messrs. Horsman and Koper and by EGATS Vice-President Geoff Gillett. To get acquainted, a very friendly and relaxed get-together took place at Geoff's place, where his wife Sally had prepared the guests a very fine buffet.

On the second day of their visit, the Russian delegation was welcomed to the Maastricht Centre by Deputy Director, Mr. Ehrmanntraut, who gave a presentation on the

EUROCONTROL organisation and the MADAP-system. Believe it or not, this complete presentation was done in the Russian language. Since Mr. Ehrmanntraut has been at a Russian school in his early youth, this was not that much of a problem for him, except for the more modern words, which did not exist at the time. Thanks to his great effort, Mr. Ehrmanntraut was able to do the full presentation in the Russian language, which, of course was highly appreciated by the delegates.

The presentation was followed by an introduction to the Maastricht UAC Director, Mr. P.J. Stalpers, who received a token of appreciation by the President of the CAWU.

A tour through the operations room, whereby both the civil and on special invitation, the military side was visited, concluded the morning programme.

After lunch in Harry's VIP room the afternoon was filled with the exchange of information on the structure, organisation and procedures of both the Unions and EGATS. This meeting was deemed very worthwhile, since it was one of the reasons for their visit.

Following all this thirst-making conversation, the yearly beer-call by the Union Syndicale was attended, whereby many members of the Union were present to meet the delegation and hit a few beers or something else! During this cosy get-together EGATS Vice-President Geoff Gillett offered the Russian guests an EGATS plaque as a souvenir of their visit to Maastricht. The return speech (in Russian) by CAWU President, Mr. Gridin, was on his request, translated by Mr. Ehrmanntraut.

Unfortunately the latter had to give up, saying: "Giving a presentation in Russian is completely different from doing translations". There-



fore we were provided again by the excellent translations of Mr. Finagin, as he did on all other occasions. Later-on, at request of the military staff there was a short introduction at the bar in the GAF Casino, so that the GAF colleagues were able to meet the delegation as well. A highly enjoyable initiative, showing some "Perestrojka" from their side as well.



EGATS Vice-President Geoff Gillett offering an EGATS plaque.

Wednesday the delegation visited EUROCONTROL Brussels. In the morning they were welcomed at the Data Bank EUROCONTROL. After a general introduction on the history and tasks of the DBE, a demonstration took place at one of the terminals in the operations room.

Of course mention was made of the plans to come to a data link between our DBE and the DBC (Data Bank Comecon), which will take place in the future. Another reason for the guests to visit EUROCONTROL.

The EEC Union Syndicale offered an excellent lunch, during which time, information was exchanged on the different ways of working of both Unions.

The afternoon programme started at the EUROCONTROL Headquarters. The Director-General, Mr. K. Mack received the delegation, whereby further mention was made of the current state of affairs of the relations between the Organisation and the Russian Civil Aviation Authorities and other Air Traffic Control related subjects.

The rest of the afternoon was used for some leisure whereby naturally "Manneke Pis" was honoured with a short visit.

The programme in Brussels was terminated with a small reception at the house of the EEC Union Syndicale President, Mr. Franco Ianniello.

This terminated as well the official programme of the visit of the Russian delegation, since the last two days were filled with a touristical visit to Amsterdam, The Hague and Rotterdam and a day of leisure on Friday.

In the late Friday afternoon a small tour through the lovely landscapes of Limburg completed this day, which ended in Maastricht, where the host Union Syndicale offered the Russian guests a farewell dinner.

Saturday morning Mr. Gridin and Mr. Finagin departed from the International Airport of Brussels back home.

Looking back to this week of his visit, CAWU President Mr. Gridin mentioned the friendly way he was received and showed around, whereby, clearly all efforts had been taken so as to allow an excellent balance between official business and leisure. Hereby the hosts had succeeded in accomplishing a wonderful week which will remain long in his memory "This could only be possible," he said, "when one really has an open mind for international relationships". "It has been a great pleasure for me to have been your guest and I am sure that we will extend our relations through our exchange programmes," said Mr. Gridin in his farewell at the airport.

This visit paved the path so as to come to a common exchange programme between members in Russia (mainly Air Traffic Control Staff)



Welcome by the EUROCONTROL Director-General, Mr. K. Mack

and members of EUROCONTROL. One year a group will visit the USSR and the next year a group will come to Holland. Groups, including wives, of between 10 to 18 people plus a group leader will be allowed. Children may participate, whereby a special children's programme is possible, however, children are counted as persons of the group. Destinations in USSR may be proposed, but are finally selected and decided upon by the Russian hosts, because more international groups may be around at the same time. The visits will take place in the period between May and September and will last about 14 days. The programme will be a balance of visits, excursions and leisure time, whereby it was specifically mentioned, that the excursions will normally not be the ordinary ones which are included in the regular tourist programmes. In USSR interpreters are provided for by the host organisation. Travel to and from the USSR will be arranged through AEROFLOT on special conditions. All further costs are for the host(ing-party). This means conditionally that the guests to be

received in Limburg are on the expense of the hosts here. This is a Russian tradition and it means, thus that all expenses, including e.g. souvenirs are on the account of the hosts.

As soon as further details are available, this will be made known to the (UNION?) members.



At the Data Bank EUROCONTROL (DBE) in Brussels.

Looking back to this week and remembering the interesting conversations we had, I only can but conclude that the initiative by the Union Syndicale for this visit was an action of good and perfect public relations.

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MEDICAL ASPECTS

Medical aspects are very important items for aviation related professions in general and for air traffic control personnel in particular. Our relation with the medical department is mainly through the B.G.D. in Heerlen and in particular with Dr. M. Stekelenburg. We invited him to provide us, on a regular basis, with some medical information, which he thinks is relevant to us.
His first contribution.

Determination of vision and hearing are more frequently in the thoughts of an air traffic controller as his or her age increases. In this article, written at the invitation of the Editor, the functions of vision and the effects of age on visual accommodation are analysed.

by Dr. M. Stekelenburg

"Presbyopia - The Short Arms Effect".

Light rays enter the eye by the cornea. After they have passed the aqueous chamber they go through the pupil, the lens and the vitreous body to the retina. In the retina the light rays are transformed into electric stimuli which go through the optic nerve to the brain. (figure 1).

To see a picture distinctly, the image has to be focused on the retina and not behind or in front of it. This focusing, the accommodation, is done by the lens.

The strength of the lens is usually expressed in diopters which is the reciprocal of the focal length in meters. The focal length is the distance from a lens at which parallel rays are focused. In a normal (emmetropic) eye, this distance is about 15 mm. which is also the distance between the centre of the lens and the retina.

In a hyperopic eye, the image is focused to a place behind the retina and in myopic eye, to a place in front of the retina. (figure 2).

The relation between the object distance, the image distance and the lens is expressed by the lens formula:

$$\frac{1}{S} + \frac{1}{S'} = \frac{1}{f} \quad (\text{figure 3}).$$

The resting eye has a power of about 67 D from which 45 D is supplied by the cornea. At rest the power of the lens is about 20 D.

The shortest distance from which an object can be seen distinctly is called the near point of vision. This point is directly related with the accommodation power of the lens and the shape of the eye. If there is hypertropia, the distance of the near point is increased. If, on the contrary, the eye is myopic, the distance of the near point is decreased.

With hypertropia, vision of distant points is possible with less or more accommodation of the lens which may be very tiresome. It is therefore better to correct with a converging lens.

If vision is myopic, distinction of remote images is only possible after correction with a diverging lens.

The difference between the strength of the resting and the maximally accommodated eye is called the power of accommodation. It is about 10 D in the young adult and diminishes during lifetime. This decrease is caused by a decrease of the contraction force of the ciliary body.



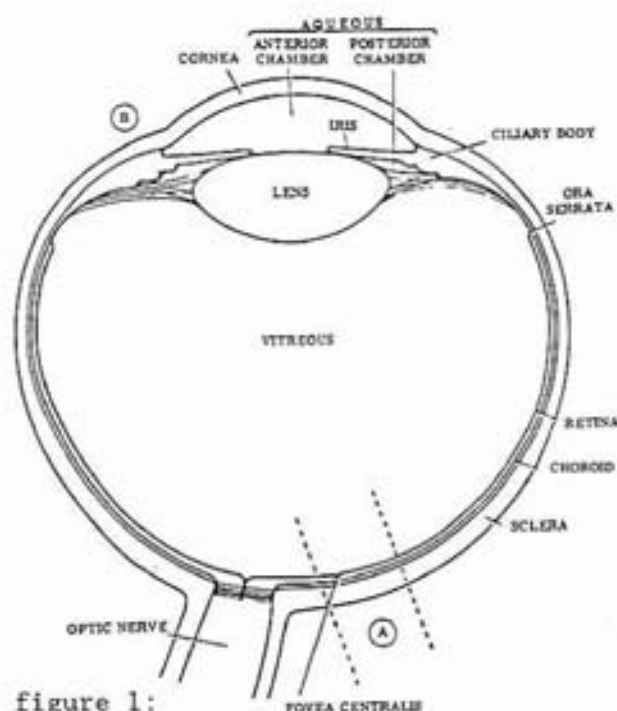
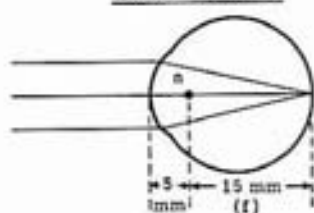


figure 1:

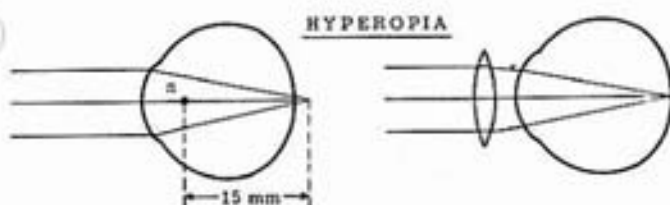
Structure of the eye.

(From Selkurt, Physiology, Little Brown & Cie Boston USA 1962).

EMMETROPIA



HYPEROPIA



MYOPIA

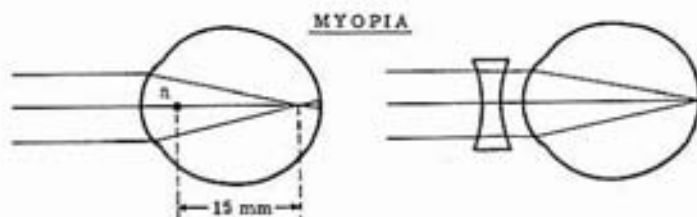


figure 2:

Optimal dimensions of the normal and abnormal eye. The hyperopic eye can be corrected by a spherical lens placed before the eye. In the myopic eye, rays focus before the retina.

(From Selkurt, Physiology, Little Brown & Cie Boston USA 1962).

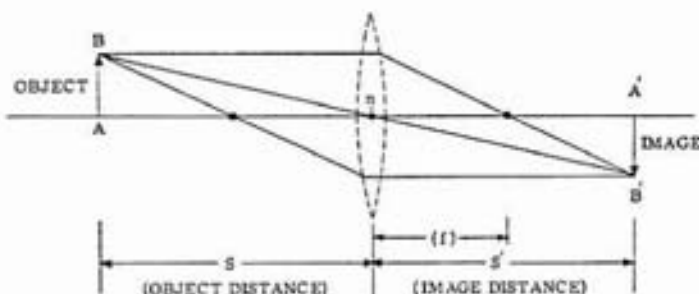
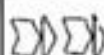


figure 3:

Construction of an image when lens strength, object size and object distance are known.

(From Selkurt, Physiology, Little Brown & Cie Boston USA 1962).



The lens acts like a plastic bag filled with a fluid. It is spread by tiny ligaments (the zonula) in the middle of the ciliary body which is a circular muscle.

When the ciliary body contracts the diameter of the lens diminishes and the anterior surface bulges forward. The shape of the lens becomes more spherical which gives an increase of the optical power. (figure 4).

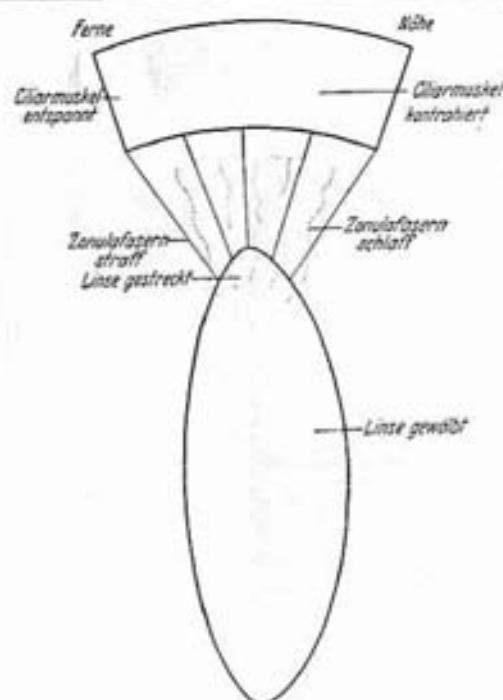


figure 4:

Accommodation of the lens.

(From Hollwich, Einführung in den Augenheilkunde, Georg Thieme Verlag Stuttgart 1968).

→ → At older age, the contraction force of all muscles decreases. The ciliary body is no exception to this rule. With the decrease of contraction power of the ciliary body, the accommodation power of the lens decreases too. The distance of the near point increases which becomes manifest in daily life between the age of 40 and 50. (see table) The arms become too short!! We call this presbyopia.

Age	Amplitude (in diopters)	Near Point (in centimeters)
10	11.3	8.8
20	9.6	10.4
30	7.8	12.8
40	5.4	18.5
50	1.9	52.6
60	1.2	83.3
70	1.0	100.0

Table:

Effect of age on amplitude of accommodation and near point.

(From Selkurt, Physiology, Little Brown & Cie Boston USA 1962).

Individual persons are different from each other. There are also people who will never have problems with nearby vision caused by weakening of the ciliary body muscle. Others have so many problems with accommodation that they even cannot focus on more remote objects. With a hyperopic eye, the problems manifest quicker. With myopia, spectacles used for distant vision cannot be used for nearby vision.

Air traffic controllers have to focus constantly to different distances. The first problems related to presbyopia will become manifest in the normal reading of books and papers. With decreasing accommodation power, there will be problems in watching screens. Bi-focal spectacles may become necessary.

If presbyopia becomes so severe that accommodation is nearly impossible even tri-focal spectacles can be necessary. These spectacles are available and can be prescribed by an ophthalmologist.

Dr. M. Stekelenburg
Medical Occupational Health Officer.



INTERVIEW

With the Director of the Maastricht UAC

Some time ago we asked the Director of the Maastricht UAC, Mr. P.J. Stalpers, whether he would allow an interview. We therefore forwarded the following 3 questions:

1. Would you be so kind and introduce yourself by describing your background and/or full career until now?
2. Air transport is on the move, as one could say. Therefore, it would be apparent that some changes for the Maastricht Centre are expected as well. Can you provide us with some of the important issues for the short and more long term future (e.g. extension of the building, further transfer of Amsterdam airspace, etc.).
3. For many years now we have had to accept certain constraints leading to a situation of decreased social conditions and less comfortable environmental situation. Apart from the very well known items, such as career projects and early retirement, there are such matters as adequate rest facilities for

personnel during day time as well as at night, relax facilities and fitness or sporting rooms.

Do you foresee in the near future any improvements in this respect?



P.J. STALPERS
Director Maastricht UAC

It is a great pleasure to publish the following "story", which we received in reply to the above mentioned questions.

My first interest in aviation dates back to 1938 when my uncle took me to visit Schiphol airport. I wanted to be a Pilot. When in 1958 I obtained my Commercial Pilots Licence (after 4 years in the Airforce), I found that jobs were hard to get. I kept my licence valid for 1½ years, gave it up and joined the RLD in January 1960 as a trainee controller.

I was a controller from early 1962 to 1965 when I became a staff member at Headquarters in the Hague. The objective was to get a 4-year training in all quarters of the service but instead became involved in system

design and development at Schiphol. Working Groups for system design, training and procedures were later established as staff bureau's. In 1972 I was asked to set up a new bureau: Project Planning.

In 1974 I was appointed Deputy Head of Operations, in 1981 Deputy Director and in 1986 Acting Director.

I was fortunate to arrive in Maastricht (July 1987) when the uncertainty about the future of the Centre was resolved. There was room for development.

Fortunate also was the considerable period of overlap with the former

Director. I had ample time to look into the future. It was fairly obvious that three main subjects had to be addressed. The first was staff planning, especially controllers. It was known that we were short of controllers and that we had to start Ab Initio training but the long term view was missing. With the input of Operations, Administration and Division 01 the planning is now well in hand but at the same time we must realise that we will be short of controllers for a number of years. The second subject was the lack of office space. Everybody seemed to be asking for more rooms. This combined with the planned resectorisation and replacement of the ODS was the basis to put our floor space requirement on paper.

An architect study is due to start. The Budget provisions are in the draft 5-year programme although not yet approved. We have not specified a squashhall or a sauna but the situation with respect to relax facilities and office space for EGATS will be improved. We aim at realisation in 1992.

The third subject is the further development of the Centre. You know that during the past years, investments were only approved as far as they were required to maintain an appropriate level of safety. Now that in principle the road is free for further development it appeared essential to design a comprehensive Maastricht Development Plan. This plan, which is up for decision during the next few months covers the period till the turn of the century. It includes the resectorisation programme, enhanced planning coordination, our function in the integration project, the ODS replacement and the changeover from the present MADAP System to high order language software environment and an upgraded system architecture. Let us hope that the plan will be approved. It is a tight programme but worth working for. Early retirement is a complicated issue. The Committee of Management has decided that early termination of service will be implemented (55 years). The problem is to agree on the

conditions. The Preliminary Maastricht Coordination Group (PMCG) has ruled that a permanent scheme must be implemented with priority, in order to define the working conditions for newly recruited staff. There now is a proposal which is up for decision in June/July. The more pressing, sensitive and difficult problem is the transitional scheme for present staff.

The National Administrations, however, are aware of the urgency and intend to arrive at a proposal before the end of this year. For planning purposes it has been agreed to aim at implementation in 1991/1992 at 57 years and 1992/1993 at 55 years.

I have a high regard for the difficult role of EGATS as a professional organisation. Difficult because of the lack of a formal status within the organisation, and therefore the lack of resources. Your expert opinion on operational/technical matters is highly valued by Ops Management and myself. I was very much impressed by your forum "to fly or not to fly" last year and heard many favourable comments.

I do hope that the relation between EGATS and Management will continue in a spirit of mutual understanding and assure you that my door is (nearly) always open.



FLYING THE AIRBUS A320

A line pilot's view



by Martin Alder

My own history. ATCA Heathrow 1969 to 1972. ATCO LATCC 1972 to 1978. HS 125 flying at Heathrow from 1978 to 1985. BCAL BAC1-11 1985 to 1988. A320 course Toulouse with Aeformation from February to April 1988 and now operating under BAW

The A320 is probably the most advanced subsonic aircraft in service with the airplanes today. It is believed to have at least a five year lead in technology over any other aircraft currently in production. With the delay, if not demise of at least the original 7J7 concepts, it looks set to maintain this lead for some time, at least as far as shorthaul turbo-fan aircraft are concerned.

The aircraft appears fairly conventional in its configuration. Its form does, however, reflect some fairly advanced aerodynamics. It is a low wing aircraft with relatively modest sweep back. The wings have mechanically simple but aerodynamically advanced high-lift devices. The engines are slung fairly well forward on underwing pylons. It could appear to be just an underfed Boeing 757. However, this conventional appearance disguises a host of features which are new to the civil field, and revolutionary in any field.

Structure.

Firstly the structure. This has a high proportion of composite materials, both as primary and secondary structure. For example, although the wing boxes are metal, the flaps, slats and various fairings are carbon fibre or other such composites. This is not so novel, but what is new is the 'plastic' tail surfaces, both the fixed and moving parts. This follows the lead Airbus set with the plastic fins for A310-300's. The metal structures use titanium as well as steel and aluminium.

The aircraft is powered by a pair of high by-pass ratio (6:2:1) CFM56-5 engines of some 26,000 lbs of thrust each. They are 'state of the art' having a fully digital fuel control system that protects the engines from just about any pilot abuse one could expect. Starting is fully automatic to the extent that it will even try a second attempt if the first attempt fails, after having of course carried out the perfect drills for a failed start first! These are produced by General Electric and SNECMA. An option which will be available on later aircraft will be the V2500 engine, built by the rival Rolls Royce, P & W, and MTU consortium.

Systems.

The aircraft has a number of systems carrying out the various functions that are needed for a modern airliner to operate. Electricity is generated by two engine driven generators. An APU driving a third similar sized generator gives both flight and ground power if required. In the (hopefully) unlikely event that all three are unavailable, then an emergency ram-air powered electrical generator is available to provide essential power for flight. Even if all this fails, then battery power will provide for at least 30 minutes of flight.

The hydraulic system consists of three independent systems running at 3000 psi, each having at least two sources of power for pressurisation. This power is used for the flight

controls, high-lift devices and various other functions e.g. under-carriage retraction/extension, braking, steering, etc...

In addition the aircraft has other 'housekeeping' systems, such as a fuel system capable of holding just under 19 metric tonnes of fuel. The air conditioning system is able to provide a comfortable environment for a total of up to 184 occupants (crew and pax) at FL 390 (BAW configuration is for 152 pax plus crew). All of the systems are state of the art. For example, the nosewheel steering is 'steer by wire', as the braking. All systems are both highly automated and highly redundant, such that most single failures do not limit normal operation to any significant degree and require little pilot intervention in normal use, or abnormal use.

In addition to these necessary, but mundane systems, which are all advanced in their way, the aircraft has what are probably its most obvious different and most glamorous systems. These are the flight control, the flight management and guidance and the flight instrumentation or displays.

The flight control system is of a type seen up to now only on advanced military aircraft such as the F16. The flight control system is hydraulically powered and electrically signalled. Control is by a side stick and conventional rudder pedals instead of the more usual control column and rudder pedals seen in transport aircraft. The side stick is a bit like the ones you use for computer games, only I suspect quite a bit more expensive! This provides electrical signals via the flight computers, or, if they are not operating, then the control jacks are directly signalled. It uses all three hydraulic systems for redundancy with no mechanical back-up. This is similar to the systems in the Trident and Boeing 747. Its revolutionary parts, is the full time use of a total of 5 main and two sub computers in normal operation of the control surfaces. These modify the stability of the aircraft to ideal standards and optimise the handling characteristics in all flight regimes.

In normal flight the computers provide a type of control that effectively means that the pilot no longer

demands a control deflection by movement of his flying controls, but instead demand a trajectory. This is slightly modified during landing and take-off phases so as to give a more conventional feel. In flight this means that no longer do you have to hold of bank and apply back pressure to stop the nose falling when you enter a turn, but that you merely apply a roll demand until the bank angle required is achieved and then you let go! The little black boxes then maintain 1 G and a constant angle of bank until the pilot gets bored! In turbulence any upset is automatically corrected. If the pilot accelerates or decelerates the aircraft, the system automatically maintains the flight path as the speed changes and trims the elevator loads to zero. If the pilot attempts to bank the aircraft to greater than 33 degrees, the auto trim is inhibited and conventional up elevator must be applied and roll demanded. The bank angle is automatically limited to 67 degrees and at



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this angle full roll demand and full up elevator is required. If the stick is released then the aircraft automatically rolls back to 33 degrees of bank. Why might one ask 67 degrees of bank? Well, that corresponds to 2.5 G which is the aircraft's limiting load factor. You are now likely to be wondering what would happen in the event that the aircraft were rolled over in a jet upset. Well that's been thought of too. The controls react just like any other aircraft, i.e. they demand control surface deflections proportional to control stick displacement until the aircraft's attitude is within its normal envelope.

All of these capabilities are provided by the computers which also provide various protections. These include overspeed and overstress (load alleviation) protection as well as low speed/high angle of attack protection. These protections will in normal use, prevent the aircraft from being damaged by aerodynamic or 'g' overload or from being stalled. Recovery to a safe state is effected automatically within the specified envelope.

The protections are quite automatic in operation and allow for a degree of pilot mis-use. For example, the overspeed protection will, even if the pilot attempts to force the aircraft to a higher speed, prevent the Vmo being exceeded by more than 16 kts. If excessive 'g' is applied, the ailerons and outboard spoilers are deflected upwards to unload the wing tips and relieve the loads on the wing roots. An accidental foray into a high angle of attack will firstly result in anatural desire by the aircraft to lower its nose to reduce the angle of attack. This function will not allow an angle of attack greater than the maximum to be achieved even if the pilot should try to do so by deliberate control input.

If the pilot overrides this, then provided the aircraft is not on the landing phase, then at what is known as alpha floor, not only will the aircraft be wanting to lower its nose to reduce its angle of attack, but full rated power will automatically be applied to both engines regardless of throttle position and auto-thrust mode. The effect is spectacular to say the least, as anyone who have seen the

Airbus display at Farnborough or Paris can testify. To be flying at something in the region of 110 knots with 28 degrees of nose up attitude and climbing at 2500 fpm in the landing configuration is quite something. This capability would normally only be used as part of a windshear escape manoeuvre, where the A320 is probably the aircraft that would be most likely to succeed in effecting a safe recovery. Of course you no doubt harbour the suspicion that computers and software may not be perfect and the question arises in peoples minds as to what would happen if all of the computers should fail either individually or in total. This risk has been minimised by selection of different software and hardware in the systems as well as sifferent design teams for the software. Even the computers used to design the software had to be different. The chances of a common software bug or other failure must therefore be considered as extremely remote. With the number of computers and the design philosophy involved, individual failures have little or no effect on the aircraft's handling. A double failure of the ELACs (elevator aileron computers), would leave the A320 as a conventional aircraft in roll with a fly by wire aircraft in pitch, but without the full protections of the normal system. A further failure of all of the three SECs (spoiler elevator computers), would leave one with a totally conventional aeroplane with normal handling and trimming. A failure of the side stick for some electrical reason would leave pitch control by a mechanically signalled tailplane (normally used for trimming) and roll by use of mechanically signalled rudder by use of yaw. In this condition it is certainly possible to land the aircraft in the simulator and I have personally flown down to around 200 feet in real life with no exceptional difficulty. The flight control system is without doubt one of the great achievements of the aircraft.



Flight Management and Guidance System

The next system is the FMGS or Flight Management and Guidance System. This combines 3-D navigation with what would in a conventional aircraft be the auto-pilot functions. Navigation is based on what is now rapidly becoming the state of the art system of three laser based Inertial Reference Units combined with DME/DME, VOR/DME or ILS/DME area navigation. The system uses its IRS and radio sensors to compute the aircraft's position to a high degree of accuracy. Normally it is the DME/DME which decides the FMGS position used for navigation, but where this is not available then the FMGS will assess its most accurate remaining navigation sensor and use accordingly. Currently the system is still being developed to provide enhanced vertical navigation capability along with improvements to its lateral navigation. Its normal mode of operation is by use of a stored flight plan for the route concerned, which is pilot modifiable for runways, SIDS and STARS, ILS

etc... to be used. Its data base contains various items such as nav-aids, waypoints and airfields which can be used, along with the capability for the pilot to create a limited number of personal waypoints. The information presented to the pilot is very comprehensive, ranging from TAS and ground speed, to windspeed, time to destination, estimated fuel at destination, optimum speeds for the various phases of flight based on fuel price and other costs, as well as optimum levels. All in all, everything that a pilot would need to know. In addition to this the flight guidance part signals in the auto-pilot and auto thrust functions. The aircraft has two auto-pilots and auto-thrust systems. It will be capable of CAT 3 B autoland operation in due course. Its extensive capabilities also include the ability to execute an automatic go-around and cope with an engine failure during the go-around.

The navigation information is displayed by part of a system of eight CRTs. Two smaller ones are used as input/display units for the FMGS, two

A 320 Cockpit



are used for the ECAM and four for the primary flight and navigation displays. The six large CRTs are arranged as pairs. Two are side by side in front of each pilot as primary flight and navigation displays. These replace all conventional flight and navigational instruments. We now have map displays with weather radar overlaid, along with the flight plan way points. Gone is the artificial horizon and the ASI. Now it's a picture of the artificial horizon with vertical and horizontal tape displays for the pressure instruments and compass. Gone too are the engine instruments and that mass of tiny dials and lights. Now it's a set of computer graphics with a series of schematic diagrams of systems. In the event of a fault, then the system page is displayed on one ECAM with what to do in the form of a checklist sequence on the other. Switches are now far fewer and are very well organised on the overhead panel. In normal operation none of the internally illuminated switches are lit. If a drill or failure requires a switch action then the switch will either be illuminated before the action, after it, or both. In each case it is very obvious what is happening. The management of normal and abnormal situations is far easier than in previous aircraft.

What is the result of all this high technology. Well, for the accountants, I did see quoted seat mile costs of in the region of 25 % lower than those of a Boeing 737-300. For engineers there is an aircraft with extensive built-in test equipment that prints out its own fault reports postflight and which if the manufacturers are right will probably put them out of work! For the passengers, there is the quite marked improvement in facilities over its competitors. It has wider seats and a wider aisle, such that you can pass the catering trolley to reach the loo! It also has a galley of reasonable enough size for cabin crews to work in and such niceties as a changing table in each toilet for changing babies. For the crew, we all get a very good working environment. For pilots it's about the best toy on the market, with a quite marked improvement in capacity over even the A310.

Capabilities and ATC.

What are the aircraft capabilities, and how do they affect pilots and ATC? Its take-off performance is very good, requiring modest runway lengths. It is I believe possible to operate from Jersey to Tenerife South with a commercial load, if ever such a demand should exist! Quite a change from the BAC-11 500 where Jersey to Gatwick was a struggle on a summers day with a full passenger load because of runway requirements. Its rate of climb at typical take-off weights of around 55 to 60 tonnes, is such that no one can reasonably expect to be at a cruise altitude of FL 370 some twenty minutes or so after brake release.

Typical sustained rates of climb are 3000 fpm to FL 100, 2000 fpm to FL 220, 1500 fpm to FL 300 and 1000 fpm to FL 390. This can be increased by using the 'expedite' facility of the autopilot. Here speed is traded for rate of climb followed by a maximum gradient rather than maximum rate of climb, i.e. lower IAS and climb rate than normal, but shorter distance to reach a given altitude. The trade of energy gives quite a marked increase in climb during the slow down, something like an extra 2000 fpm for around 1 minute when reducing from 280 knots to 210 knots, but you do need initially to be at normal climb speed for this zoom effect to be manifested. As an ex BAC-11 driver, where FL 270 by Veule could be struggle, I appreciate the ability to make FL 340 or above and at lighter weights and low temperatures, even FL 370. Its maximum cruise speed of up to 350 knots indicated or Mach .82, equates to around 480 knots true airspeed at normal cruise altitudes. A more typical figure being Mach .79 and around 460 knots in this age of minimising costs. It will operate at up to its maximum permitted altitude of FL 390 at weights of up to 67.5 tonnes, which for the 100 series is effectively maximum take-off weight. Although altitude does affect economy of operation, it is possible to take a normal load of passengers to Malta at FL 190 if required for any reason, with not exceptional increases in fuel usage. In the cruise and using our FMGS, we can go direct to just about anywhere that has an approved ICAO

designator, either airfield, navaid or intersection or reporting point, as well as to any latitude and longitude defined fix.

Nice long directs are now done precisely, rather than as the educated guesses used on the BAC1-11! Descent will eventually be able to be programmed so as to follow any altitude restrictions or targets automatically or any programmed profile from cruise until established on the ILS (a feature added by designers who have obviously not witnessed the London TMA on a busy day!) Our current standard does give warning of what the FMGS thinks should be the start of descent and will predict the distance to a specified level. This should improve the odds of the aircraft being at the right altitude over a specified point! Descent capability is very good, with expedited descent given over 7000 fpm. A normal descent gives around 2500 to 3000 fpm, so it is quite a flexible aircraft. On the approach the aircraft is again very flexible. Its designers had obviously been out in the real world and have given the aircraft realistic flap limiting speeds and deceleration capabilities. There is no restriction on the use of speedbrakes other than with full flap. The aircrafts ideal approach profile is the decelerated approach. The profile of this is as follows. Firstly at not less than 1800 ft aal in level flight

below the glide slope, or around 2000 ft on the glide slope around 200 kts (this depends on weight but would be this value at 55 tonnes) in clean configuration. Then at the given altitude or as the glide slope starts to move, flaps 1 is selected followed by a continuous deceleration and further selection of flaps and gear so as to be at Vref plus 5 at 800 ft aal.

As one can imagine, 170 knots to the marker should be no problem. Final approach speeds are in the range of 134 knots at 60 tonnes to 123 at 50 tonnes. Landing distances are fairly short, their unfactored distance from 50 feet being only some 850 metres at maximum landing weight.

Conclusion.

As a pilot I have found the aircraft very interesting. It is definitely different to other aircraft. Some may find this a little disconcerting, but the obviously large Gallic input to its design reminds me of Citroen cars. These are also a little different and somewhat peculiar compared to other cars. However, after a little use the peculiarities become 'normal' and nothing else seems quite as good!

Altogether it's a very remarkable aeroplane, which promises to be a success for its manufacturers and a pleasure both for crews to operate and passengers to use.

COURTESY 'TRANSMIT' (UK)
thanks to Martin Alderl



FEATURES

by Philippe Domogala

This is a new regular feature from Philippe Domogala. It will show out-of-the-ordinary, specific or even strange things happening in another country's ATC

This issue: USSR



Last February I went to Moscow to attend an ICAO FEATS Meeting. From a previous visit in '85, a few things had changed: no visible police, Michael Jackson on the Radio and a camouflaged US Air Force C-141 parked on the tarmac alongside a dozen Ilushing 62's.

After investigation it turned out that:

- 1) the police had been "diverted" to more pressing tasks in Armenia;
- 2) Michael Jackson had just been in Moscow and
- 3) the C-141 was here permanently to help monitor the destruction of missiles as part of the US/USSR agreement.

The rest was unfortunately much the same as before: a desperately outdated and not functioning economy full of very friendly people.

The Soviet Union is probably the only country on earth that is able to send rockets to Mars and Venus but has not yet discovered how to distribute toilet paper to its own people. Gorbachov is trying to change all that but what an enormous task he has!

Now, enough about the generalities, what about ATC?

At Moscow Airport, Sheremetievo, there is no control tower to be seen anywhere. Where it is, the subject of much speculation and bets among our party. We finally found out: there is no BIG Tower, but 2 very small ones!

Approach control is done in Vnokovo, another airport 50 km. away. Aircraft are handed over to the tower when established on ILS and when departing, the tower hand over traffic when passing 200 m. (600 ft.) climbing. For these procedures you do not need a high tower.

A small room with windows at the runway threshold is all what you need and it is just what they have. Between the 2 parallel runways, at each end, is a one storey small house from where the Aerodrome control is done. As there is no shortage of staff in the USSR, both Towers are manned, so that QFU changes can be done without disrupting traffic or involving transportation of controllers from one site to the other.

Another interesting feature about Moscow ATC is the controller. We knew an action of some form was taking place but we could not grasp what it was. A strike in USSR, unthinkable, but it was underestimating once more the ability of the Russians to by-pass every rule to get their way in day-to-day Soviet life:

We found out that about 550 controllers in Moscow were fed-up with their working conditions and their poor pay (bound to happen there also). They circumnavigated the strike problem by refusing to accept their monthly salaries. They continued to work but stopped paying their bills, rent, loans etc... putting AEROFLOT in a difficult position. (in USSR controllers, like everybody else dealing with civil aviation, is part of AEROFLOT).

At the end of February, 288 of them signed a petition to the Soviet Government asking for an improvement



of their pay, working conditions and equipment with which they work, using the Route Charges that the USSR collects from foreign airlines overflying the USSR.

A very interesting form of action indeed. Apparently "Perestroika" is also revealing the same problems that the West encounters. I wonder if the Soviet nurses will follow.

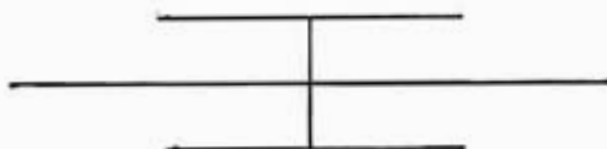
CONCLUSION:

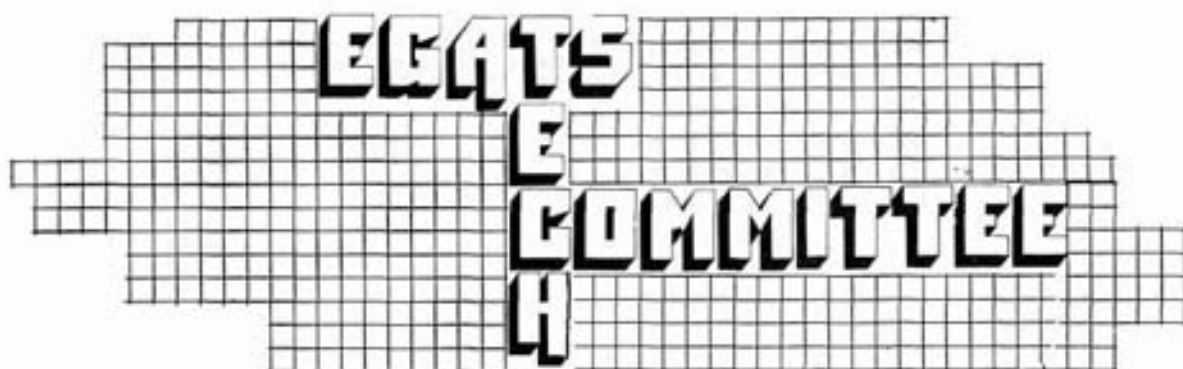
After an attempt to see the BOLSHOI ballet (we bought tickets on the black market which turned out to be fakes!) it was time to come back.

I returned in an AEROFLOT

Tupolev 154 which had a hick-up: every 10 minutes or so the aircraft was veering abruptly to the left, then correct back ... After the 5th or 6th time I inquired with the crew: "a false contact between the electric pilot and the wave absorber ..." I was told. I think it could be auto pilot / jaw damper but I did not elaborate. I could also not quite figure out if the colour of the pilot's face was influenced by the bright green paint that covers everything but the instruments in the cockpit, or it was just plain fear ...

I decided to return to my seat and listen to Michael Jackson ...





— by Henk van Hoogdalem —

The Technical Committee of EGATS reports its recent activities to keep the Ops. room staff updated about items under discussion, studied, proposed and/or forwarded to Operational Management. The TC realises that many rather urgent changes cannot be implemented in the system because of various reasons such as budget limits, technical possibilities and future developments not yet known to us. These handicaps may not stop the TC to continue a half yearly dialogue with Ops. Management and to be available for control staff with questions and proposals.

1. The QDM list is under investigation to implement such changes to optimise this tool for daily practise.
2. Field 15 is studied to find out if the Oceanic Entry Points can always be presented in the FDM.
3. In 1990 a new CCTV system will be available, presenting 60 pages of information. The TC will propose to reserve some pages for company designators, since the number of companies is still growing and more and more new customers use the MADAP airspace. The TC will co-ordinate this proposal with Peter Vercruysse.
4. Some of our controllers gained experience in Brétigny in working with a TID presenting call signs in

alphabetic order. The TC is studying this phenomena to eventually have this available in Maastricht in future.

5. The AGM of EGATS decided to inform the Airlines concerned about possible implication for these airlines when in April 1990 the upper limit of Brussels ACC is raised to FL 245. The TC is preparing these letters.

Members of your TECHNICAL COMMITTEE:

Jan van Eck, Ernst Vreede, Paul Hooper, Hermann Mertz, Christian Macé, Harry de la Haye, Jack Snijders and Henk van Hoogdalem. Due to their new functions Ralf Hölscher and John Doyle are now considered advisory members which is appreciated by the TC.



TECHNICAL COMMITTEE

— NEIGHBOURS —

The ABN Bank, your next door neighbour!

The ABN bank is the largest International Dutch bank and has almost 1.000 offices in 43 countries around the world. Therefore, it is well acquainted with the adjustments associated with moving abroad.

Unfamiliar banking systems, for instance, are often puzzling. Therefore ABN would like to give you an idea of the wide range of financial services this bank offers and how we can assist you.

Standard services, such as personal accounts, savings accounts, securities, precious metal accounts, various types of ABN credit and the ABN insurance plans are available.

The ABN bank is a member of the Amsterdam Stock Exchange and the European Options Exchange. As such, the bank is well-placed to handle all types of investments in Dutch and

international shares, bonds and options. ABN also manages some attractive mutual funds, like ABN Bond Fund, ABN Equity Fund and the America-Fund.

ABN bank will offer personal services to all EUROCONTROL employees, whereby there are special rates for mortgages, investment advice and competitive exchange rates possible.

The ABN bank is situated at Maastricht airport (Partsbank building), where Mr. Frank van Banning and his staff are more than willing to assist you with your banking affairs. With our newest computer systems in banking we would like to meet you to fit your personal wishes with a personal advice.

Looking forward to welcome you in the ABN bank.



The ABN bank staff.



LATEST NEWS: IN SPRING THE ABN MONEY MACHINE WILL BE AVAILABLE FOR A 24 HOUR SERVICE.



THE EUROCONTROL INSTITUTE OF AIR NAVIGATION SERVICES

A review by Dr. R. Baldwin

Although the INSTITUTE is well known to most readers, it is timely to review the range and scope of services that it offers, together with the policy of its present Director.

Next year sees the twentieth anniversary of the first course commencing at the EUROCONTROL Institute. Since starting there have been many changes, so now is a good time to review the Institute's activities for readers of Input and indicate how the Institute can be of help to them in their career development.

The Institute was established to be a school for the advanced training and specialisation of ATS personnel together with being a didactical and pedagogical study centre. These two activities are expanded in the Institute's role of acting as a forum for the exchange of knowledge and experience in all ATS matters. In addition, non-communal training, such as ab-initio ATC courses are provided for National Administrations as and when required and, of course, for the Maastricht UAC according to their recruitment programme. This gives a fully integrated capability which is most beneficial to Member and Co-operating States.

These activities take place on a communal level for the agency and the Member States although there is a liaison between the Institute and the training services of the National Administrations. Where appropriate, there is general co-ordination of member state training through the Training Working Group which consists of representatives from each Member State and the Agency.

In addition, the open courses are made available to states, of European and other continents, which gives the Institute a truly world-wide international reputation. So far students have attended from 82 countries, with many countries being supported by ICAO Fellowships as the Institute is recognised by ICAO.

Training Courses

This year the Institute will offer 56 types of courses, mostly "open" but some "on demand" according to the specific needs of national administrations.

Such wide range of courses can only be offered by a certain amount of overlapping and staff being flexible in their range of expertise. In addition new courses are regularly introduced according to demand and less popular ones dropped, although these may have to be kept available if they are very specialist and only required occasionally.

The subjects offered fall into five main groups, calling for special expertise, experience and knowledge.

a) Air Traffic Control

This includes all aspects of ATC from ab-initio, area radar etc. to refresher courses, upgrading courses and Air Traffic Flow Management.

The Institute is well equipped with procedural and radar simulators, the Instilux 2 being well known for its advanced capabilities together with acting as a test bed for the organisation to look into the most effective ways of conducting simulator exercises.

A very useful course for support staff gives a one week review of the purpose and general functioning of the Air Traffic Services in the national and international context. Those who attend find that afterwards they are in a much better position to understand and support the work in which they are a part and feel much more

motivated.

- b) **Automatic Data Processing**
This group encompasses ATC automation, data processing applications and applied mathematics. A fast moving range of subjects which require continuous adjustment to the operational changes that occur. The courses are carefully designed in modular form so that appropriate sequences can be followed, either continuously or over several years as part of a training progression scheme.
- c) **Engineering**
High technology is moving fast and those developing and maintaining the equipment must keep up with developments. This is the essential theme of courses in the engineering department, which address a number of disciplines of particular relevance today. Many other subjects could be addressed but the Institute is constrained to limitations in staff numbers and the consequent range of expertise. However, urgent requirements in subjects such as satellite communications (plus navigation and surveillance), digital communications and radar are receiving attention. At present courses offered are dependent on the staff concerned being heavily involved with the actual technical systems being installed or operated in the various administrations of the Member States.
- d) **Instructional Techniques**
Working in an advanced ATS Institute the staff have naturally gained a deep experience in a wide range of subjects - and this should be passed on to others. The courses cover all aspects of training from the basic principles of instruction to techniques in simulator training, aspects for coaching for on-the-job training and the management of training. Most of these courses contain a

large element of practical exercises, cases studies and risk-playing in order to ensure that attendees are gaining the maximum benefit from their presence at the Institute.

- e) **Management Courses**
Managing the resources at our disposition is becoming more and more of a complex task, so much so that there is a need to learn the basic management skills and then continue learning more advanced skills as we take on more and/or different responsibilities. The management courses start from the basic principles course and then branch into aspects dealing with communication, people, projects or the use of computers. As for the instructional courses the accent is on



- non-radar training -

practical activities which allow regular self-critical analysis of individual performance. This can be achieved through the active participation of colleagues or Institute staff and of course the use of closed circuit TV.

Teaching Techniques

Strictly speaking this section should be entitled Pedagogical and Didactical techniques as these two words express more precisely in French and English the need to ensure that the Institute is always using the latest and most modern methods of ensuring the most effective transfer of knowledge, skills and experience

to those who are in the forefront of operational activities.

The projects involved under this heading tend to be long-term and not immediately cost effective, but they do ensure that the Organisation is prepared and ready for the urgent problems that arise in the near future.

For example there is an urgent need to train air traffic controllers and all means must be employed to enhance the quality of training whilst reviewing subject areas where time can be reduced or the quality of training enhanced. The key is of course in practical training, and here there are a number of ways in which skills training can be imparted. The present system of theory and then on to a main-frame computer driven ATC simulator is, and must be, the core of the training programme, but we must look at whether this is the most effective way of starting a programme or finishing it.

To this end the Institute has recently commenced a project called EUROSIM which aims to provide a systematic, integrated approach to all phases of the ATC training programme from formal Institute training, to on-the-job training, validation and further into continuation training.

In parallel with the above there is another project which aims to improve the quality of aerodrome and approach training based on computer graphical simulation. This is extremely beneficial to member and co-operating states that require these skills in their courses, but we must also remember that area controllers must be familiar with these techniques, and indeed they also have to complete these phases in their training for employment as EUROCONTROL Area Controllers.

There are several other technical and operational projects presently underway at the Institute, but as space is limited I would like to comment on one project which is essential for communication amongst controllers - that is the use of language. I feel that the answer lies in most of us speaking several European languages (say three?) and each of us must strive to achieve

this capability. Consequently the Institute has embarked upon a project to extend an established structured data base which can be used for developing the comprehension and use of another language. The intention is to initially concentrate on English for languages used in aviation subjects. In particular it is hoped to identify levels of attainment for each subject discipline so that the language teachers will have a practicable, workable guide to levels required prior to progression to the practical ATC subjects.

Forum Activities

There is an often held opinion that education and training stops at, say, age 23, and then all else is either actually doing the job or else talking about it. The former is obviously essential to achieving the expedition of air traffic, but the latter concerns how can it be done more safely, more efficiently, more cheaply, and even how will we do it in the future?

The real answer is that we never cease our education and training and



- radar simulation -

all of us must always be striving to improve procedures, the system, our own performance and also that of others.

These requirements can be developed in a number of ways, and how it is achieved depends on the job together with the type and nature of person involved. One aspect is continuation training, which takes many forms. There is of course the formal refresher course which introduces ATS staff to new procedures,



"TRAINING BY WIRE"

techniques etc. whilst reviewing methods of tackling problems that regularly occur. This course takes operational or technical staff away from the workplace and enables them, in a (relatively) neutral atmosphere, to review and discuss, in a structured process, ways in which they can improve performance. If they come to Instilux they have the added advantage of being able to mix with staff from other authorities/disciplines outside working hours and they can achieve that degree of European harmonisation that is so often dreamed of.



In addition, there is the informal, but structured programme, that is traditionally called a conference, seminar or workshop. These activities are usually regarded as get together for technical interests during the day and exotic activities during the evening.

In practice they are well structured and thoroughly thought out, which ensures that important and contentious matters of the days are raised and discussed in a formal environment, followed by an informal atmosphere which enables personalities wider scope for discussion. Such functions do require a conducive atmosphere - and here the Luxembourg Institute strives to ensure smooth liaison and co-operation amongst forum attendees.

These activities are legitimately part of training as they ensure the effective transfer of knowledge, skills and experience with the added advantage that all parties gain from each other and thus raise the sum level of human endeavour. It is wrong to ask in the narrow sense what such meetings achieve as they operate on the broad scale and perpetuate the desire to refine and improve by originality or building on the achievements of our fellow men. It is by expanding our vision that we see over the horizon.

The Future

The Institute is committed to serving the Organisation and thus is constantly seeking the views, requirements and needs of those who use the Institute. It is a tool to be used in the training context of harmonising the Air Traffic Services of Europe, but like all tools we must continually question its shape, form and constituent elements. I believe that the majority of these elements are right and proper to meet the role put on us by the Member States but we must strive to adjust these elements in a flexible and caring manner.

To this end the Institute regularly conducts surveys amongst Member States and the Agency to identify future training needs. This has recently resulted in enhanced student numbers.

CONCLUSION

The EGATS journal has always contained lively and informative articles of an operational and technical nature for air traffic services. However, probably all its readers have been through an initial training programme and they should now see themselves undergoing continuation training until retirement. Thus I am very pleased to have been able to present this review of activities at the EUROCONTROL Institute of Air Navigation Services.

Continuation training is a way of life. We are all entitled to it in order to enhance our job proficiency, but in return we are all obliged to pass on our skills, knowledge and experience to the next generation. That way society advances and I expect the Institute to play its part in the advance.



The objectives of EGATS are:

To promote the safety, efficiency and regularity of international air navigation. To contribute in the development and establishment of safe and orderly systems of Air Traffic Control by collective rather than individual research.

To maintain a high standard of professional knowledge and efficiency among Air Traffic Services Personnel.

To protect and safeguard the individual and general interests of its members.

To establish and maintain relations of mutual benefit with

similar or related professional organisations.

To promote, encourage and enhance in general the work of the Air Traffic Services Personnel and to develop and promulgate knowledge of Air Traffic Control in all its aspects and applications.

To promote and co-ordinate the Social, Cultural and Sporting activities of its members.

To sponsor and support legislation to increase the safety of Air Navigation and the establishment of the profession of Air Traffic Control.

EGATS is a member of the
INTERNATIONAL FEDERATION OF AIR TRAFFIC CONTROLLERS' ASSOCIATION
(I.F.A.T.C.A.)



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INPUTS' editorial team:

B. v.d. Flier	Editor
G. Gillett	Co-editor
P. Demelinne	Lay-out
M. Germans	Artwork

Staff writers:

P. Domogala and J. Florax.

Word-processing:

Carolyn Vodak and Josette Noelmans

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