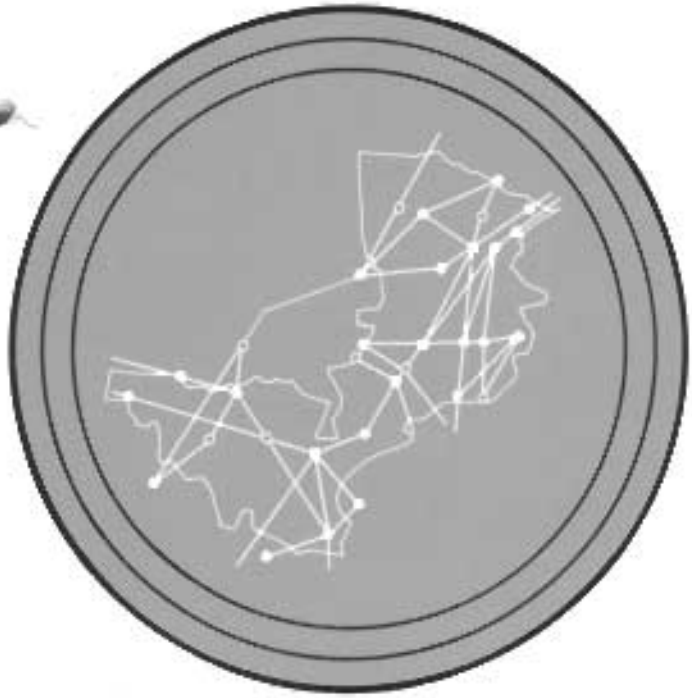

INPUT

EGATS QUARTERLY SPRING '78

Input

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Output

Who's minding whose business?

Is it possible that improvements in aircraft technology will lead to disadvantages for air travellers? Will their journey take longer than in more antiquated machines? Although the object of producing new light aircraft is to provide potential customers with a more efficient, comfortable and economical form of convenient private transport, have manufacturers considered the possible impact upon the air traffic environment as a whole?

The biz-jets are a familiar sight in the upper airspace these days. Most of them present few control problems, but some are not quite so easy to cope with. As the business aircraft market expands and pressurisation techniques improve, controllers are becoming aware of an increasing number of small aircraft capable of reaching very high altitudes but cruising at comparatively low airspeeds. This slower traffic may well create problems in the future.

It is true, of course, that controllers handling the lower airspace and TMAs must separate diverse traffic operating over a wide range of speeds. But en-route the busiest airspace tends to be that above 20,000 ft. Jet aircraft must fly at these higher levels for optimum performance. Above 29,000 ft vertical separation must be increased, so there are fewer levels available within the scope of high-flying traffic.

Because of the apathetic neglect by several authorities of their ATC services, far too many systems are already totally inadequate to handle all the potential traffic. Flow control is becoming more severe, and even in some reasonably equipped countries, short-haul scheduled flights are compulsorily restricted to punative lower levels to avoid an upper overload. Flight level allocation systems reduce the capacities between different areas even further. Even the most modern centres are often forced to establish procedural separation before handoff to less fortunate adjacent units.

Faced with all these restrictions, how can the up-and-coming generation of slow — but — high business aircraft be integrated? Many of them, even on comparatively short routes, are requesting levels above FL 300. If these levels are given, they will then be blocked for a long time for the benefit of a plane with perhaps not more than half a dozen passengers on board, because faster traffic behind, with much greater fuel consumption and carrying hundreds, cannot be separated procedurally.

Alternatively, the business flight may be delayed for several hours through the demands of flow control and limited high level capacity. Much of the benefit to the company of "on demand" transport will therefore be lost.

How should controllers allocate upper levels? On the basis of first come, first served, effectively blocking off large chunks of airspace for slow traffic? Establish priorities according to the distance to be flown? Or maybe give preference to the flight carrying the largest number of passengers or with the thirstiest engines? Whatever the choice, someone will certainly be penalised.

Or should the manufacturers change their thinking and build more sophisticated aircraft to operate lower down where more sky is available? Or should operators, manufacturers, passengers, aircrew and controllers alike be screaming with one voice, in a concerted effort to penetrate the deafness of those responsible for ignoring the needs of ATC for too long?

M. Lewis

Intercom

Letters to the Editor

Sir,

I wish to protest about the anti-smoking campaign which Input is supporting. Since the opening of Maastricht UAC in 1972, there has never been a question of prohibiting smoking in the operations room until a few months ago. Ashtrays are fitted in the consoles and staff have smoked or not as they wish. With the airconditioning there is never a fog being produced which might seriously offend non-smoking colleagues. It might be the case that the airconditioning itself is more unhealthy with a humidity better for computers than humans. I have not heard complaints from non-smokers, who by the way are subsidised in taxes by the smokers, that smokers attack their liberty. The question paper passed round the centre asked "Do you approve of smoking" which must give wrong statistics because some non-smokers can tolerate smoking but might not approve. I think it is a few only who really hate smoking. Must the history of Maastricht be changed and the ladies be pushed out of their rest-room for this extreme minority? I do not think that staff who are used to smoking while on duty will easily be able to cope, and this could even influence their efficiency. Let us leave things as they are and not change them for a few complainers. Never will all personnel be satisfied.

NSM

(NB. Input is not supporting the anti-smoking campaign, nor is it opposing it. The magazine does, however, respect the right of any Guild Member, controller or individual to express his personal opinion, popular or not, through "Intercom" or other articles submitted for publication. MJL)

Dear Sir,

I found Mr. Hooper's comments on the annual medical (Intercom, Winter '77) almost as funny as the yearly ritual itself. Why not simplify the procedure even further by introducing a "phone-in" system? To check eyesight, place the telephone receiver in front of the left eye whilst looking up the number of the medical centre in the directory, and in front of the right eye whilst dialling. If you get through, your eyes are alright, and if you can hold a conversation with the person at the other end, then your hearing can't be too bad. Since you have filled in the medical history form so many times before, it should be a simple matter to confirm that essential details, such as your parents' dates of birth, have not changed too drastically. All that is now left is to answer the question "Are you still alive?" correctly to bring the formalities to a successful conclusion, and to be declared "fit". Little money will thus have been wasted (± 10 cents phone bill), and you can then spend an extra two hours in bed – particularly beneficial if you happen to be sick at the time.

M. Maus

Dear Sir,

The letter to the Editor from Mr. Paul J. Hooper in the last issue of INPUT concerning the annual medical examinations at the Industrial Health Service (B.G.D.) in Maastricht is asking for comment, constructive comment naturally as the author requested, although it cannot be said that the style and so-called humour of his own input deserve this qualification.

If the author would have expressed his feelings at the appropriate place, e.g. the Centre's Personnel Office, he would at least have been given to understand the following:

The Director of the B.G.D. and his collaborators are fully aware of the fact that the present accomodation of their Service is a very poor one. Since 8 years the Director has devoted his utmost energy to get a new and adequate building where people can be received in a decent way, staff can work properly and adequately equipped, certainly amongst other things with a sound-proofed booth! As a result of this effort a "fine modern medical centre" is now being built and will be ready in January next year, very much also to our pleasure.

As to the annual examination itself the author (and he is not the only one as it seems) is starting from a basically wrong assumption. These examinations are not meant to examine someone's state of general health. The task of an Employment Medical Advisory Service like our B.G.D. – which in many countries has been provided for the law – is in the field of employment hazards, occupational diseases and labour environment problems. The employment medical examinations are aimed at only those aspects of health which are related to the profession exercised. Suffering and infirmity put forward or discovered during the examination are only further investigated if they are caused by the work or if they could be detrimental to the performance of a person's duties.

The vast majority of those who are examined are healthy people, an essential difference as compared with the consulting hour and the patients of a general practitioner whose task and approach are completely different. The organization of the work in an Employment Medical Service, therefore, should be different, i.e. aimed at its objectives. In this respect scientific and practical research has shown that it is appropriate to have the greatest part of the examination method done by qualified employment medical assistants. It testifies to "shortsightedness" to suppose that the quality of the examination depends on the time spent with the doctor. The image of "His Majesty the Doctor" is much more a picture of "old friends" than the tools about which the author – as he says sarcastically – "could become quite poetic". The medical care services do know teamwork too nowadays!

As to whether this is done with professional skill, we should be confident that we can leave that to the staff of the B.G.D.; an outsider, even an aircraft passenger, would not dare to criticize Air Traffic Control Staff, because he has insufficient expert knowledge to judge their work, let alone to criticize it in a destructive way; but he does have confidence all the same!

I can imagine that during the examination there is no basis for a satisfactory discussion if we start from false assumptions but it will be even worse if we – as Mr. Hooper declares himself – only indicate what we think the examiners like to hear. Such an attitude is normally not expected from adult persons who listen to reason; the insulting remark about "veterinary surgery" is significant in this context.

As to the conclusions of this article we can be brief. The Maastricht Centre cannot afford a Medical Service of its own. Above all this would be a "waste of money" indeed. Taking into account what an employment medical examination should be the General Directorate has entrusted this task to the specialised Industrial Health Service (B.G.D.). The physical and mental

criteria which must be met by a staff member in order to be allowed to exercise a certain job are those laid down in detail in the relevant Eurocontrol rules which are based on the I.C.A.O. recommendations.
A general practitioner has not the specific knowledge and experience, nor is he certified in certain countries, to perform medical examinations related to professional employment. He is the right man for examination of general health, as well as for treatment of complaints and illness.
Dr. de Bok, Director of the B.G.D. has always been – and he still is – willing to consider any complaints or suggestions provided that they are justified and put forward in a decent manner. He is equally prepared to come to the Centre and to give further information on the tasks and the practice of Industrial Health care and Employment Medicine to those who would be interested to learn more about these subjects.

F.L. Gerretzen
Head of General Services

The following letter was originally addressed to the Executive Board but is reproduced in Intercom with the permission of the author. The subject concerned is receiving Guild attention. Other Members may wish to contribute further information or comments on this matter.

Subject: Promotion.

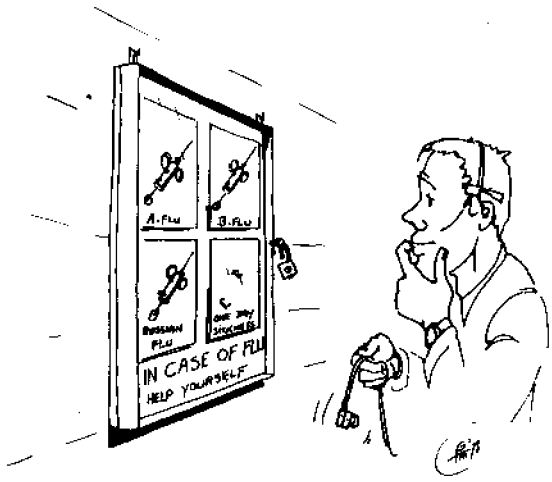
Dear Sirs,

I herewith wish to inform you about the following matter.
On the promotion-list of last year (26 june) 1977, I was proposed for B-3.
In the past this promotion from B4 to B3 has always been automatically approved, because it is a grade linked to the fact, that one has become a fully qualified radar-controller.
Now for some reason, I and another three colleagues, are not promoted, where the others had theirs with effect from jan. 1st 1978.
I would very much appreciate when the Guild would go into this matter and do some investigation, in order to clear up things and provide me with advice about how to act and re-act in this case. As well, maybe you could find out on what rule this decision is based, and if there is such a written rule, what parameters are being used.
Although the promotion seems to be cancelled, there is still time because the list is valid until 31st March 1978, and of course I'm still interested in getting it.
The verbal comment of Mr. Dieben, was that next year I will definetely be number one on the new list.

Thanking you in advance for cooperation,
I herewith sign,

yours faithfully,

J. de Lange



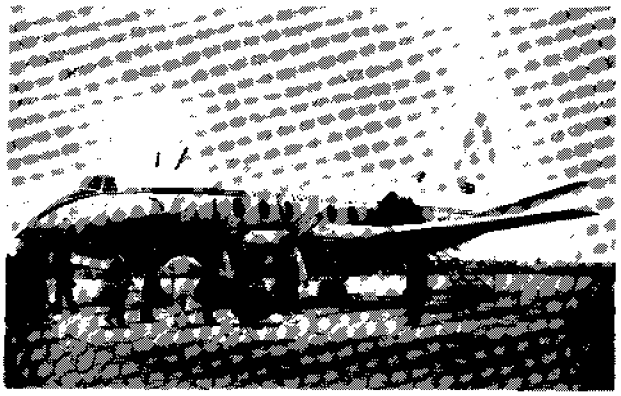
EGATS Technical committee

Most of the Control Staff will have seen the first issue of the team files. The use of a questionnaire in these files appeared to be quite successful, so we will try to continue with this method of communication at regular intervals.
The E.B. of the Guild has asked to participate in this questionnaire, so in coming files you may find questions directly concerning the E.B.
The result of the first issue will be published in the second file, whilst the information for the Convex '78 Conference will be handled directly by Mr. Präder.
We thank all of you for the cooperation received so far. Any suggestions or questions are welcome, and should be forwarded to:

Chairman T.C.
G.J. van Dijk
Team D
Brussels Sector.

Say again your type

The Vickers Viscount V. 700 series



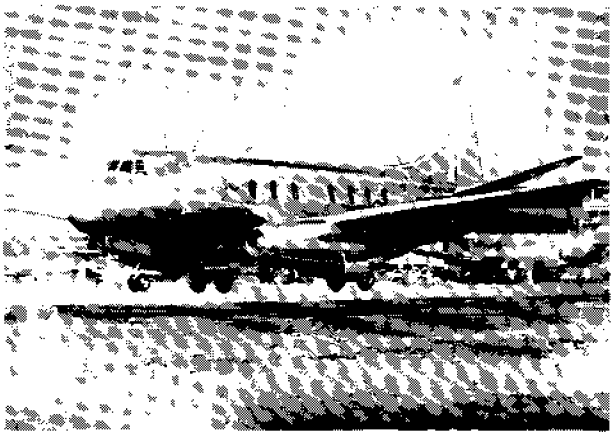
1. Passengers about to board the prototype V. 630 Viscount, G-AHRF, during its' brief entry into BEA service in the summer of 1950.

I decided that, for this issue at least, I would give the biz-jets a miss and put together a few notes on one of my personal favourites – the Vickers Viscount. Later this year the Viscount will be celebrating the 30th anniversary of its maiden flight which took place on July 16, 1948 from Wisley, the former Vickers flight test airfield south west of London. That first flight preceded a production run of 442 Viscounts which saw service with more than 250 corporate and private operators, thus making it one of Europe's more successful aircraft. Approximately 140 examples still remain.

The Viscount came about as a result of a requirement set out by the Brabazon Committee. This committee sat in 1942/3 to look into the future of British civil aviation after the war and to formulate proposals for a number of transport aircraft to satisfy future needs. One of the requirements was for a 24 seat short/medium haul airliner powered by four turbo-prop engines. To this end, Vickers submitted their project for a turbo-prop powered successor to the Viking. The Committee was obviously impressed with the proposal as it decreed that the design should be adopted as meeting all the requirements and that the company should proceed with development. Vickers-Armstrong received formal notification of the decision on April 19, 1945.

Incidentally, the Britannia was also the result of a Brabazon requirement.

In response to British European Airways' interest in the design, Vickers increased the length of the



2. The second prototype Viscount (V. 663), VX217, fitted with two Rolls-Royce Tay turbojet engines. (Rolls-Royce).

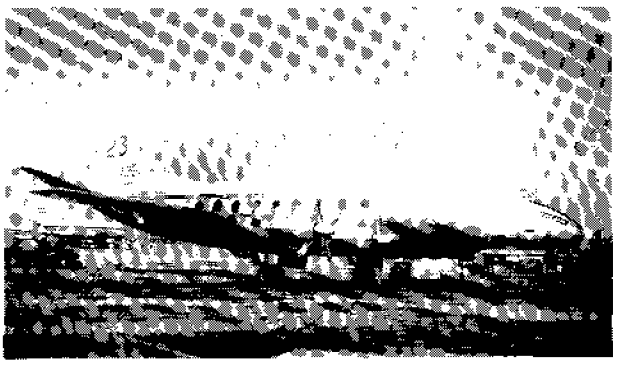
fuselage to accomodate up to 32 passengers and thereby meet the airline's need for a Viking replacement.

Up until this point selection of the powerplant had not been made, the choice lying between the Rolls-Royce Dart and the Armstrong-Siddeley Mamba. The latter engine was eventually selected in view of its' better development progress.

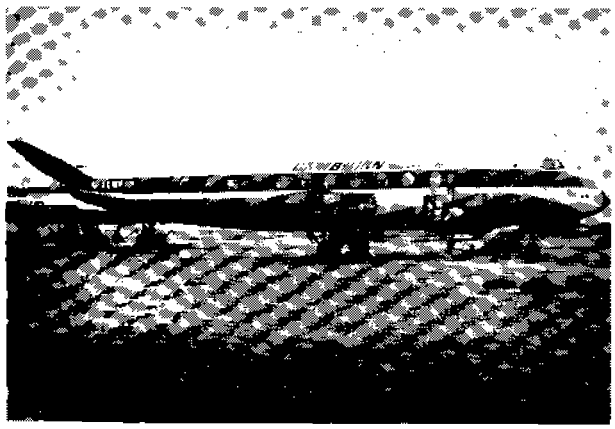
In this configuration the aircraft was designated V. 609 and received the name Viceroy. During 1947 the Dart engine, having undergone a major re-design, was finally selected as the definitive powerplant. In its' revised form the aircraft acquired a new designation, V. 630, and was renamed Viscount.

The first of two prototype aircraft, allocated the registration G-AHRF (photo 1), made its' first flight from Wisley on July 16, 1948, going on to receive a full Certificate of Airworthiness on July 26, 1950.

All the while BEA, in their inimitable style, had been negotiating a further fuselage stretch which would allow accommodation of up to 53 passengers, plus the adoption of more powerful Darts. On this occasion the airline had enough foresight to up-date its' requirements before the aircraft entered service, not always the case in latter years!

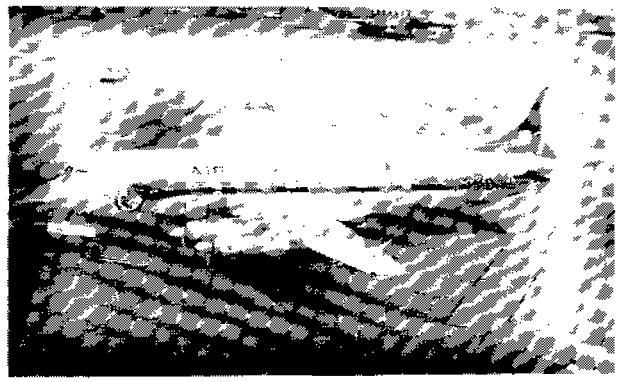


3. The third prototype Viscount (V. 700), G-AMAV, displaying the markings it wore during the London-New Zealand Air Race in 1953.



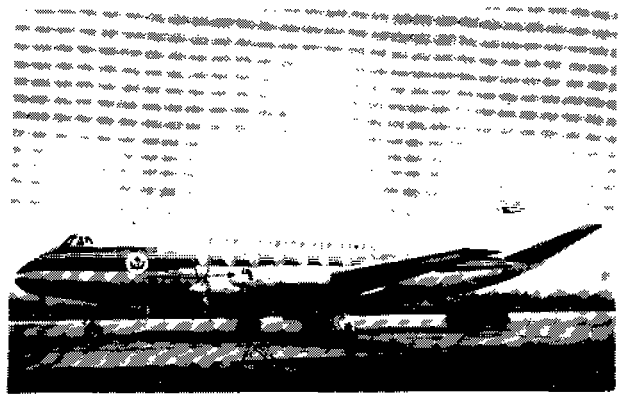
4. G-ALWF was the second V. 701 Viscount delivered to BEA. This photo was taken in 1976 at Duxford, England where the aircraft is to be restored and preserved.
During its' operational lifetime (1953-1971) 'WF accumulated a total of 28,299 flying hours and 25,938 landings.
(Paul J. Hooper).

In January 1949 Vickers decided to go ahead with the stretched version and that the third prototype aircraft, now designated V. 700, would be built to the revised specs. This aircraft, registered G-AMAV (photo 3), made its' first flight from Weybridge (Brooklands) on August 28, 1950.
The second prototype, (the aircraft only ever wore the military serial VX217 despite being allocated the registration G-AHRG) was also projected as a V. 609 but prior to its first flight, on March 15, 1950, was modified to accept a pair of Rolls-Royce Tay turbojets (photo 2). This resulted in the designation V. 663.
VX217 devoted its' life to research, operating for the Decca Navigator Company and Boulton Paul Aircraft.
On July 29, 1950, G-AHRF made history by becoming the world's first turbine powered aircraft to operate a scheduled passenger service when it flew the BEA route from London (Northolt) to Le Bourget. For the next four weeks BEA continued to operate the aircraft on its' Edinburgh and Paris services. In the meantime the airline had placed an order for 20 V. 701s, a modified version of the V. 700.
Before the Viscount could enter regular passenger service numerous flight trials had still to be completed. In order to build up turbo prop experience the two prototypes were supplemented by two BEA DC3s which were converted to Dart power during 1951. For a period of eighteen months these two aircraft were operated on BEA cargo services. In February 1953 the test fleet was further enlarged by the addition of the first two production V. 701s, G-ALWE and G-ALWF (photo 4).
G-AHRF had been written off on August 27, 1952 during landing trials at Khartoum, having accumulated a total of just under 932 flying hours.



5. The first export order for the Viscount came from Air France. Shown here is the second V. 708 delivered to the company, F-BGNL.

6. The second export order came from Aer Lingus whose first Viscount V. 707, EI-AFV, is seen here at Heathrow, London.

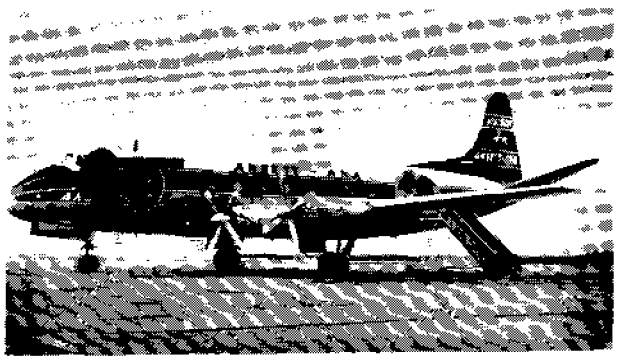


7. TCA was the first company in North America to receive Viscounts. Seen here is the company's first V. 724, CF-TGI.

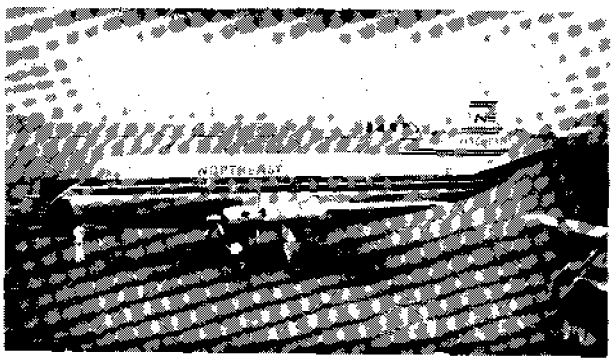
8. The second of Capital's V. 745Ds with the up-rated Dart engines.

The Viscount entered BEA service on April 18, 1953 on the London-Cyprus route, having been granted a full C of A just the previous day.
As Vickers had originally intended, the Viscount was a custom built aircraft; that is, the customer was able to order variations on a basic specification.
Each variant was then given an individual type designation, e.g. Air France V. 708, Misrair V. 739 etc. When, in June 1954, the Viscount finally broke into the American market with an order from Capital Airlines for three aircraft, the designation system had to be modified a little to take into account the numerous improvements incorporated in the American aircraft. These included the fitting of weather radar in the nose, integral hydraulically operated airstairs and the replacement of the standard Dart engine by a new up-rated version. All subsequent export orders requiring the new powerplant had the letter "D" suffixed to the type designator, e.g. V. 745D for Capital Airlines, V. 768D for Indian Airlines.
Incidentally, Capital went on to acquire a fleet of 60 Viscounts, purchasing in batches of 3,37 and 20 respectively.
The 700 series continued in production until 1959 during which period the maximum production rate had reached 10 units per month. The last 700 to be delivered was a V. 798D which went to Northeast Airlines Inc. on January 8, 1959. By this time the 800 series had already seen two years operational service, but more of that next time.

Paul J. Hooper.



9. Viscount V. 720, VH-TVC, belonging to the Australian company Ansett-ANA. This aircraft was destroyed in an accident shortly after take-off from Sydney on November 30, 1961.



10. Delivered to Northeast on January 8, 1959, V. 798D N6598C was the last of the 700 series Viscounts.

Restrictions?

Maybe you have wondered why there are still restrictions on the routes Nantes-Santiago or Nantes-Zamora?
Recently I had the opportunity, between two planes, to visit the LISBON ACC.
Imagine a room half the size of the Maastricht canteen, containing three sectors: one EAST, covering the whole ground area of Portugal; one WEST, covering the sea; and one COORDINATION sector, placed in between, which receives and passes the estimates (a sort of planning sector).
All control is done procedurally, with strips.
There is no operational radar; however, there is a scope beside the East controller with a primary picture including clouds and clutter, but the controller can only use it for information, and then on his own responsibility. In fact they only use it to verify that aircraft have crossed each other. This radar is not useable north and south of the country or over the sea (limited range).
They expect a better radar in 1983 or later, but no automatic system.
The communications facilities with other centres are limited to three black bakelite telephones, manual type, placed on a table and labelled CASABLANCA, MADRID and SANTA MARIA.
To store the handwritten strips, they have a kitchen table full of them placed behind the controllers.
So much for the Centre, now let's talk about the traffic situation.
Most of the traffic orientated North-South with destinations Canaries, Morocco, Madeira and of course Portugal itself.
All the companies flying to these destinations want to depart and to return at the same time.
All the pilots want to fly at the same flight level.
Casablanca, the southern exit, having the same equipment problems as Lisbon with the addition of a very bad frequency coverage, and having also to accept all the traffic coming from Spain, accepts only a certain number of aircraft per hour. Sometimes they even refuse traffic for a certain period of time.
Faced with these facts, the Lisbon controllers themselves decided that they had no alternative other than to impose a limitation on the traffic acceptance rate in order to preserve some degree of security above Portugal.
If you add to this that the average salary for a Portugese controller is *f* 1000,– per month, to rent a flat costs *f* 300 to *f* 500 a month, and petrol for cars costs *f* 2,10 per liter, you might understand the situation better.

Phillippe Domogala
12 Feb 78

Traffic information - how essential?

Traffic information – how essential?

It is often impossible for a radar controller to pass information on all unidentified targets to every aircraft under his control. This may be due to a number of reasons – a heavy traffic load, frequency congestion or perhaps sheer volume of unknown activity within a certain area for example. Regulations exist to the effect that traffic information is to be given "at the controllers' discretion subject to workload". In theory, aircrew should be looking out for strangers anyway, but they have their normal cockpit duties to perform, and can do little watching in IMC. Controllers normally feel a moral obligation to advise aircraft of possible hazards. Although there may be many false alarms, the pilot's comments in the following extract from an airmiss investigation indicate just how important a timely warning might be.

R: Bealine 742 Radar, there is unidentified traffic, altitude shows flight level 290 between 11 and 12, range is five miles, crossing from left to right.

A/C: 742, we have him in sight ... 742 ah ... they are three aeroplanes, jet fighters I think.

R: That is correct, they are squawking military at least, and ah ... I read still flight level 290, is that correct?

A/C: 742, yes, it's a section of four Phantoms, we would say, and ah ... I would also say it was fairly close.

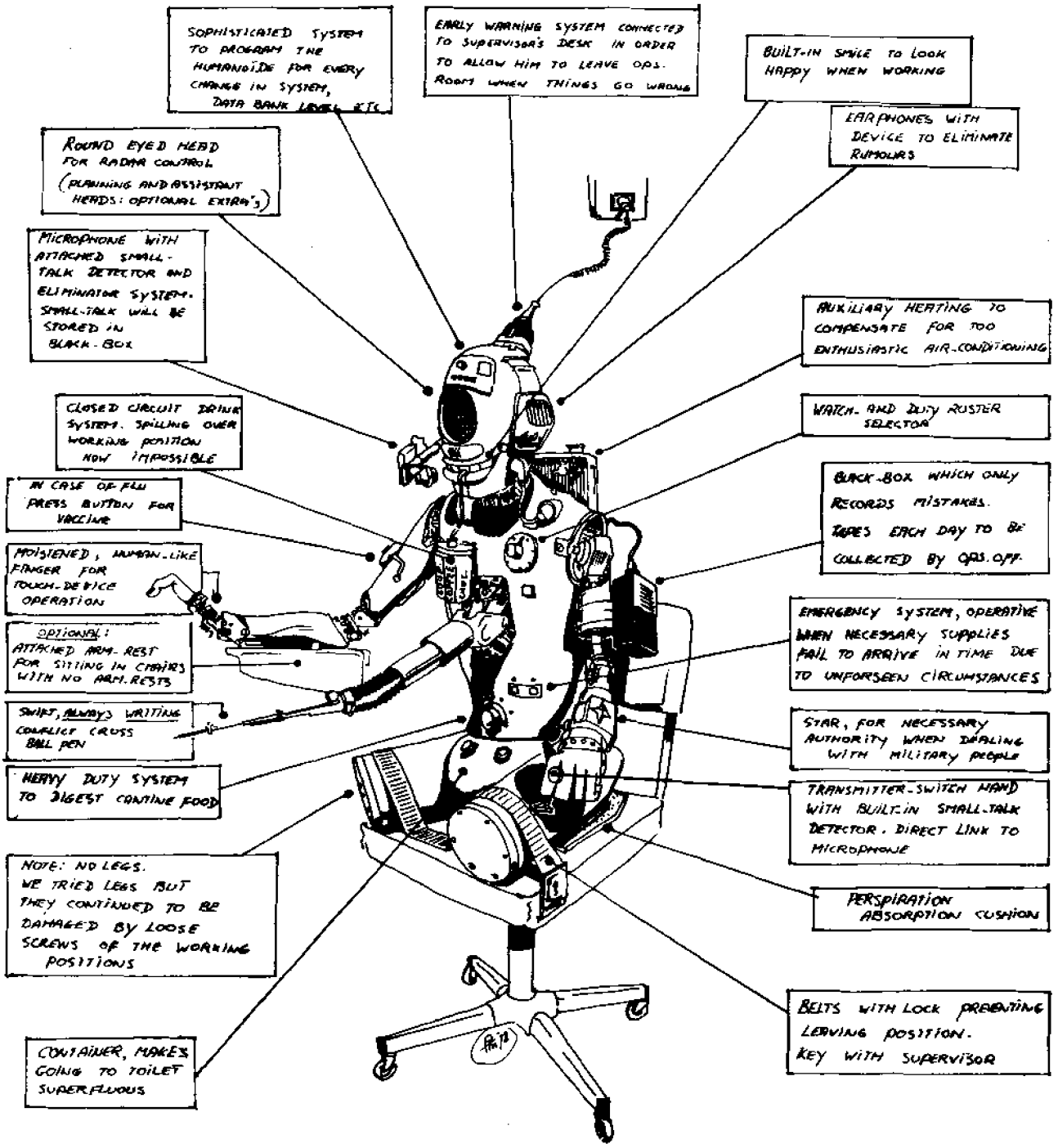
R: 742 that is affirmative, I got on radar estimated one and a half miles, is that correct?

A/C: Certainly no more.

(Relevent details were now taken as a formal airmiss was filed)

R: Bealine 742 for your information, the other aircraft are traced in the meantime, four Phantoms from Ramstein airbase.

A/C: 742 thank you, yes, we recognised them as Phantoms and thank you for warning us, we were in and out of cloud but oddly enough just at this moment of time were diverted by looking-up something inside the cockpit and unless you said something we probably wouldn't have looked-up for another 30 seconds or so.



ADVANCED HUMANOÏDE EURO-A.T.C. ROBOT
"ORWELL" B3-80

SAVVAN - The right direction

From EGATS Brétigny Branch.

Members of the Brétigny Branch of EGATS were recently given the opportunity to experience at first hand the test flights of caravelle FBJTI, an aircraft which will be particularly well known to controllers at Maastricht and other UACs in the Eurocontrol region.
The Brétigny members were first introduced to Mr. Banet, who until recently worked at Paris ACC/UAC, and the ops personnel of SFA at Melun.
They were then welcomed aboard FBJTI by Mr S. Flypo, chief pilot of SFA-CNFA "Division Avions Laboratoires".
Thanks are due to the following people who helped in organising this interesting experience: Mr. J.F. Spain, Chef du Service Regional France; Mr. D.D. Lipman, Director of the EEC Brétigny; Mr. F. Yessan, Operational Trials Section, EEC.
After reading the following text, fellow controllers will understand better why the SAVVAN Flights put certain constraints on Air Traffic Services.

The SAVVAN (Automatic in-flight navigation aids checking system aids) was first designed for inspection of VOR infrastructure in France. We understand by the word «inspection» a verification of signal quality as received by users of air space. Therefore the system is operated in conditions as near as possible to real working conditions, high altitude, allweather... In another respect no particular adjustment is carried out in advance on radio aids before the inspection.

VOR signals collected in space during inspection are technically analysed in order to supply maintenance services with answers to such questions as: Is the VOR aerial correctly positioned with respect to the North?

Are there no recognisable defects in its radiation? (quadrantal error for example).

Is the signal properly modulated?

The analysis is also made in an operational context and brings out the distinctive features that directly interest both the user and Air Traffic Control:

Average bearing and stability error of VOR information in a given zone.

Shape of the most frequently used VOR radials.

So the objects of VOR inspections are quite different from those of conventional calibration flights. These objects are typically those of routine, check which is entirely carried out by SAVVAN today. The latter is thus supplementary to calibration methods.

VOR inspections with SAVVAN are based on the fact that an aircraft at a height of about 30.000 feet is in radio view of numerous VOR, DME and TACAN provided that the ground network is sufficiently concentrated. So a laboratory-aircraft, equipped with sufficient sensors, can collect a large number of signals concerning DME distances and VOR bearings and record them on magnetic tape. When returned to base it is possible to estimate, with a time lag, the position of the aircraft at each moment from which position the bearing errors for each VOR signal received may be reckoned.

SAVVAN equipment shipped on Caravelle FBJTI is composed basically of the following elements:

First, 3 DME interrogators and 10 VOR receivers with numerical control and, output, constitute the principal sensors. Precision of the «SAVVAN point» i.e. a few hundred metres in most cases, depends basically on the 3 DME interrogators. The large number of VOR receivers is due to the need to reduce to a minimum the flight time to collect data in certain areas where VOR are concentrated.

A magnetic recorder allows, firstly, for memorising instructions and data before flight, secondly, for storing data collected during flight on a suitable IBM compatible tape.

A logic system, built around a multi-purpose computer, collects – at a sampling rate of about one per second – data supplied by the different sensors and records them in a suitable form on tape. In addition, this logic system automatically controls change over of receiver channel as flight progresses, in accordance with a preset programme. It obeys any special orders that the operator may wish to give during flight.

For this reason, a visualization and control console enables the operator to hold a limited dialogue with the computer through a key-board and numerical display.

The equipment is contained in a light alloy container that takes the place of 6 passengers. The assembly, of weight less than 400 kilos, requires a power of about 1500 VA.

Processing at base of SAVVAN data, carried out by CII 10,070 processor, requires specialised programmes. A software programme exists for flight preparation as well as a sorting and processing programme for data collected in flight. This latter which chiefly deals with the estimation of aircraft position at every moment during flight,

finally delivers a set of reports. Each of these reports concerns one VOR station and gives its results as far as possible in a grouped form. One hour's flight processing takes ten minutes.

The system was operated in flight for the first time in 1970. 2 DME interrogators were added to complete the equipment during 1971. During 1972 restricted flights, concentrated on the Paris region, allowed the first reports to be made. Working on parallel lines, the «SAVVAN trajectory accuracy was checked» in comparison with the reference trajectory set by the tracking radar of the Landes test centre.

Meanwhile difficulties which had not been expected at the start had to be overcome:

In order to fix without possibility of error and to a second of arc the geographical coordinates of VOR, DMEs and TACANs, the Institut Geographique National (IGN) was called in; they used aerial photographs to make a new reckoning of the coordinates of each station.

The magnetic variation of the various places was also subject to discussion. Finally the variation shown on the last isogonic map published by IGN was adopted for each place; the value of the variation was corrected according to the expected drift of variation as function of time.

Lastly, it was confirmed that an aircraft can collect a large number of radio signals at a height of 35,000 feet above Europe. At this height it is not rare to discover that a VOR receiver, tuned to the channel of a given station, receives a signal from another station when conditions are favourable. So greater insistence was placed on check out of station identification-signals and on cutting out, by software, signals received from undesirable VOR. Since the end of 1972 five VOR inspection campaigns have been carried out, of which 3 were in 1974.

French ground network today comprises some 70 VOR and T-VOR, also 12 DME as well as some TACANs.

In order to inspect these VORs, using Caravelle, the campaign is divided into 11 different flights that follow preset paths through upper space.

Measurements are usually taken at level 350.

Choice of stations to be inspected, in any part of a given trajectory, depends upon such considerations as:

Distance from aircraft to stations, risk of interference from undesirable stations transmitting on the same channel. This choice is made with help from the computer and is translated into instructions given before flight to the system on the aircraft.

The flights required for each campaign represent a week's work for one Caravelle, i.e. about 40 flight hours.

From the first five VOR inspection campaigns some facts may be established of a general nature.

In the first place, the VOR error curves obtained by SAVVAN have very often the same general appearance as those obtained by conventional methods. The most noticeable differences are concerned with average error, that is in fact, with the choice of the «north magnetic reference» (see above). In addition when a VOR is situated on an unfavourable site the signal received by SAVVAN is often of a greatly inferior quality to those received at low altitude during VOR calibration flights.

Secondly, during successive campaigns practically all VOR had uniform performances. Even the most uneven error curves proved to be identical to the previous ones from one campaign to another.

Continual developments are being made on SAVVAN. Some are destined to widen the range of parameters on which investigations are based. With this in mind an automatic decoder of VOR/DME identification signals is being put into service. In the near future a device for analysing the spectrum of signals received on board Caravelle is to be added to the system. Other developments are concerned with the quality of the SAVVAN trajectory. For it is possible to improve the accuracy of SAVVAN positioning. As a start, a third DME interrogator has just been integrated in the system. If required, the flight path might be smoothed later using data from the computer or even data from inertia.

As was intended, SAVVAN supplies the only method in use today for the routine check of French VOR Facilities. This activity requires about one month's operating each year. So the system has a potential capacity for taking over VOR network inspection for the whole of Europe. Similarly the system could be adapted for other uses. SAVVAN is, in fact, not only a navaids checking system but also a means of testing which could be used in any experiments that need reference localization at high altitude.

(Information extracted from the "Bulletin d'Information du STNA, 11th December 1975, and reproduced by kind permission of Mr. G. Martel, head of the 'contrôle en vol et homologation' division of the STNA.)

ATS being interviewed for a post with Eurocontrol "I see from your previous record that you have had a number of responsible positions, this is very good because if anything goes wrong in the ops room we would like you to be responsible for it".

Controller survey/ opinion poll

(In the interests of democracy, Maastricht staff have been enabled to express their opinions on certain subjects by the use of internal questionnaires.)

1. APPROACH ROAD

Do you:
a) Drive slowly due to potholes? ....
b) Drive on the wrong side of the road to avoid potholes? ....
c) Drive across the field to avoid cars avoiding potholes? ....
d) Walk, due to a broken axle sustained by choosing a, b or c? ....

2. MAIN GATE

Do you:
a) Drive straight through the gate because it is open? ....
b) Stop short of the gate while the shortsighted guard pretends not to recognise you, and hope that he will eventually open it? ....
c) Run the gauntlet and try to pass under the lowering barrier before it hits your car roof? ....
d) Park outside because your nerve is weak? ....
e) Walk because your car is being repaired after losing at (c), or due to the fact that you completely forgot about the barrier? ....

3. SALARIES

Do you prefer:
a) To receive your salary statement before your salary? ....
b) To receive your salary rather than just a statement? ....
c) Your salary paid in before your monthly standing orders are paid out? ....
d) Your salary to arrive late
   i) due to unforseen internal difficulties? ....
   ii) because the bank has lost the transfer tape? ....

4. WATCH ROSTER

Do you think that there should be elections:
a) To select a roster committee? ....
b) To choose a committee to select a roster committee? ....
c) To create a panel to choose a committee to select a roster committee? ....

5. CANTEEN

a) Are canteen facilities sometimes available during your shift? ....
   i) Yes, fortunately/unfortunately*
   ii) No, fortunately/unfortunately*
   * delete as applicable
b) Do you eat in the canteen? ....
   i) Yes, whenever possible ....
   ii) Yes, whenever I forget my sandwiches ....
   iii) Yes, when there is a ban on Sunday driving ....
   iv) No, not if I can help it ....

If the answer to (b) is Yes, is it because
i) You like the food? ....
ii) You are a shareholder in Shell Oil Products? ....

6. COMPLAINTS

Which of the following do you not approve of in the ops room?

a)	Smoking	....	e)	Computers	....
b)	Spitting	....	f)	Dandruff	....
c)	Bad breath	....	g)	Air conditioning	....
d)	Deodorants	....	h)	Questionnaires	....

Should there be a seperate restroom for those who object to any or all of the above (in which case the ladies restroom will be used)?

a) Yes, because I object strongly ....
b) No, because we have to put up with each other anyway ....
c) Yes, because staff should have a choice ....
d) No, because I am a lady ....
e) Yes, Sweetie, because I want to use the ladies restroom, too ....
f) What was the question, again? ....

7. QUESTIONNAIRES

When presented with a questionnaire do you

a) Answer to the best of your ability and return it? ....
b) Deface it and return it? ....
c) Make a paper aeroplane, and rely on others who answer (a)? ....
d) Not applicable, since you have torn this paper up? ....

And now ... the computer that answers back?

Sperry Univac is producing electronics that provide the user, in actual spoken words, information or instructions that will help him in his work. Under contract to the Federal Aviation Administration, Sperry Univac Defense Systems Division developed an Automatic Voice Advisory System (AVAS) which advises pilots of the location of aircraft flying in their vicinity.
A typical computer composed message might read:

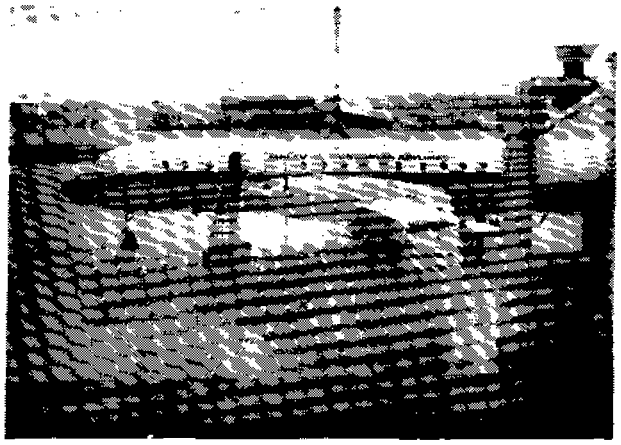
"November 4 6 Charlie, Traffic 3 miles, Northbound, Transponder Reported Altitude 2 Thousand 6 Hundred."

AVAS uses the Sperry Univac 1616 mini-computer. The system provides storage for 1,200 seconds of speech on a single disc drive. Since the disc controller can handle four drives, a total vocabulary of up to eighty minutes of speech is possible.
The Sperry Univac 1616 mini-computer can add pauses for phrasing and since it stores redundant vocabularies with flat and falling intonations, it can end each phrase with the intonation that approximates normal speech.
It is part of the Sperry Univac basic research philosophy to provide natural sounding and easily understood computer generated speech. Speech quality is the most important objective. Other objectives include the development of a large vocabulary and the ability to use general purpose digital hardware. In the future, systems will be developed which, instead of using pre-recorded speech, actually synthesise spoken message directly from ordinary text.
Voice response experiments have been successfully accomplished in Swedish, Chinese, French, German, Greek, Arabic and Russian languages as well as English.
In another application of computer generated voice, Sperry Univac developed a system for selected weather information read-out. The system has been tested at the Minneapolis-Saint Paul International Airport.
It takes little imagination to realise that computer generated voice can help air traffic controllers and pilots in many areas.
For example, the Sperry Flight Systems Division developed a system which provides a near real-time digital readout of current altimeter settings. This information can be provided to pilots by computer generated voice.
Runway visual range, ceiling information, runway-in-use and other information can be maintained up-to-date and read to pilots by the computer, relieving the over-burdened air traffic controller of these tedious and time-consuming chores.
The experimental work in Air Traffic Control voice response recently resulted in an automatic voice response system sold to a major European mail order firm. The mail order spin-off was sold through the joint efforts of Sperry Univac Germany and the International Systems Division of Sperry Univac Defense Systems.

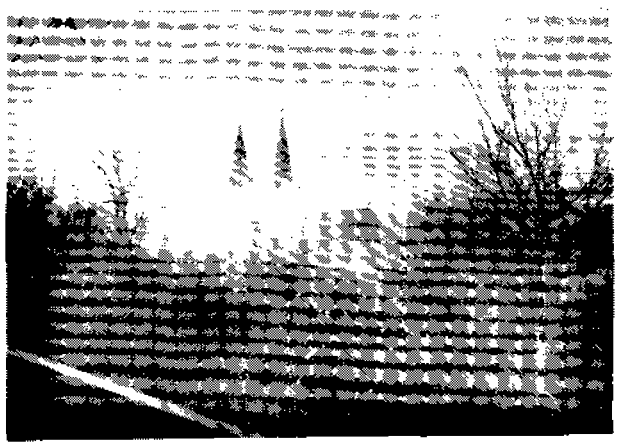
(Courtesy Sperry Univac)

SCOPS visits Budapest

From Saturday 19-11-77 until Tuesday 22-11-77 a group of SCOPS members, accompanied by eight charming wives, visited Budapest, following an invitation from Malev. At 0900 hrs on Saturday the group left Beek airport by NLM Cityhopper, arriving at Schipol at 0945. The time until our next departure was filled in the good Dutch way of reading papers, drinking coffee and playing cards. Due to the fact that there were too many passengers for the TU34, the flight was made in a good old Il 18 which can hold approximately 30 passengers more. We took off from Amsterdam at 1345 and touched down in Budapest at 1530 after a very comfortable flight and an excellent meal.
During the flight one of our party was allowed to visit the cockpit. Thus we learned that the Il 18 is flown by a cockpit crew of four; two pilots, one engineer and a radio operator/navigator. All r/t was done by the latter, although one of the pilots does keep a listening watch on the frequency. To our surprise, the pilots' altimeters showed the height of the aircraft in meters. However, the radio op/navigator had an altimeter calibrated in feet. The airspeed indicator showed kilometers per hour, while the DME was also displayed in kilometers. On the DME indicator there was a conversion ring, though, to convert km to miles. A weather radar was available, albeit a very oldfashioned one with the old hood to keep out the daylight.
In Budapest we were met by a charming lady who introduced herself as Mrs. Etta Vicenty – she wished to be called Aunt Etta, though.
To our surprise, this lady spoke perfect Dutch, which was very pleasant as she was going to be our guide during our stay in Budapest. On the bus she introduced us to an elderly man who was to be our personal bus driver. This man was one of the funniest characters you have ever seen.
After having been introduced, we set off to our hotel, situated in the "Buda" part of the city.



The journey from the airport took about one and a quarter hours, but after about fifteen minutes our bus driver was swinging behind the wheel, both hands waving to us and his cap back to front on his head. He was called Gyorgy, but because of the difficulty pronouncing the names of these two Hungarian people, we rather quickly renamed them Aunt Etna and Uncle Vesuvius, names they appreciated very much.
After a quick shower at the hotel, we were taken to Restaurant "The White Dove", where we enjoyed a splendid meal and found out that even the Hungarian Gypsy orchestras know the song "Tulips from Amsterdam" and other songs like that. The quiet restaurant was soon alive with our singing and dancing. After dinner we made a short visit to "The Fishermens' Castle" near the Matthias Church, situated on top of a hill from which there is a magnificent view of the Danube and the Parliament. We returned to the hotel at about 2300, where we visited the dancing on the top floor only to find that they ran out of beer at 0030, giving us a reason to go to bed.
Stating that "a programme is a programme", our guide made us get up at 0700 hrs on Sunday morning. After breakfast we left for a day's trip from Budapest, via Eztergom, the Czechoslovakian border and along the Danube back to the Capital. In Eztergom we visited a beautiful cathedral and also had a look at Cardinal Minszenty's palace. In the cathedral we went into a museum which contains a beautiful collection of gold masterpieces, amongst which are several crowns of former Hungarian kings and cardinals' crosiers. After the cathedral and a drive of about half an hour we reached the ruins of the ancient Franz Josef Castle on the banks of the Danube, where we spent about one hour. By that time we were all feeling rather hungry, so we went to a fine restaurant for lunch. Afterwards we visited the world famous porcelain museum Marrit of Kovacs, and some of us set out to aquaint themselves with the Hungarian pub life. The bus then returned us to the hotel to prepare for our next dinner party. Sunday evening was spent in a nightclub, The Maxim, in the "Pest" part of Budapest. There we saw what the Hungarian night life is like. The variety show lasted till about 0130, after which two unfortunate members of our group had the dubious honour of entertaining twelve of the others in their room.
Monday morning found us "very refreshed" for a city tour of Budapest. On this tour, which lasted about two and a half hours, we were shown the most beautiful parts of the Hungarian Capital. Included was a brief visit to the Nebstadion of the People, a stadium which can be entered by bus so that you don't have to walk far to reach your seat. The stadium can hold 100,000 spectators.



After lunch, which was served in the fantastic baroque restaurant "Hungaria", we left for our football match against a team from Malev. Needless to say that after the time we had spent having a good time, we lost the match by 7–2. Of course, it was not just through our own fault, but also because of the high standard of the Malev team.
We spent Monday evening with our friends from the Malev team in the Golden Barrel Restaurant. Under the influence of the Hungarian music, the wine and the delicious food, we soon had a fantastic party going in which our Hungarian companions participated to their hearts' content. At 2300 the restaurant "closed" after our polonaise, but the party continued in "The Weinstube" of our hotel, the 'Hotel Budapest', into the small hours of the morning. When we finally took leave of our Malev friends, the two of our group mentioned previously were again in a position to put their room at the disposal of the rest. When everything was quiet again at ..... everybody took their three hours sleep, because reveille was at 6 a.m.
At 0645, good old Uncle Vesuvius took us to the airport. There we said goodbye to two great Hungarian friends, who had enabled us to have a great stay in Budapest. Aunt Etna and Uncle Vesuvius will always be remembered by this group, that is for certain.

Taking off on time, our flight back to Amsterdam was made in a TU 134. On the climb to FL 350, the aircraft was still making at least 1500 ft per minute above FL 300. The method of descent was different from what was expected – on receiving a descent clearance, instead of retrimming the aircraft, the pilot just pushed the stick forward and dived.
After a two hour stop at Schipol, we arrived back in Beek at 1500. Everybody then said goodbye and thus a great trip had come to an end.
One thing is certain; the new yell for SCOPS is DA DA DA DA DA DA DA DA DA DA etc.
Hallo fans let u even niet op hem.

Budapest Approach and Tower

Monday afternoon we paid a visit to the TWR-APP-unit at Budapest airport. The APP was manned by two controllers and one assistant. The room was equipped with two raw radar displays of Plessey's and a PAR, Telefunken produced by the CSSR, plus a Russian height-finder which gave the altitude in meters. The APP controls traffic up to FL 165, which is fed into the TMA via 5 entry points. Like the TWR it is a completely civil unit. Military co-ordination problems, like we in western Europe experience from time to time do not exist. All traffic is allocated a 4-digit code and thus the military controllers can keep track of every aircraft in the air. The ACC is located in Budapest city and is a completely military unit, controlling military as well as civil traffic. The TWR is a very spacious room, manned by a controller, a telex operator and a supervisor. Budapest has about 150 movements per day. The main RWY is 31-13, part of which can not be used due to the fact that there was a B 707 parked at the beginning of it. Flight progress strips are about 8 times the size of ours. Red holders for outbounds and green ones for inbounds.

F.J. Le Noble

Sorry GBS.

A certain charter flight (nameless of course) was making a rather rapid descent into Barcelona. Due to unusual weather conditions for a few moments there was a bit of condensation in the cabin. One witty young lady on seeing water running down inside the nearest window, made the remark "its true, the rain in Spain does fall mainly in the plane".

Duty rosters

1st Duty Rosters Study Group Meeting

The meeting was opened by the Director U.A.C. Maastricht at 1005 hrs: when he gave a brief resume of events leading up to there being two watch-rosters being in use at U.A.C. Maastricht. The D.G. has now decided that it is time for Control Staff to work a common roster!! — he has charged the Director to set up investigation into the feasibility of bringing this about.
The Director wished to know exactly why the two sets of staff preferred their own rosters, but the Study Group declined to answer that at the present time, promising to do so at a later date.
The Director also added that at this time it was not possible to reduce the working-week from 41 hours.
Mr. J. Dickmann was proposed as Chairman of the Study Group, but he declined the offer, and in turn proposed Mr. K. Dittmar, who accepted.
The terms of reference stated that "a majority of Control Staff" must accept the eventual common roster proposal, and this was defined as 80%!!
A general discussion then ensued, at which the following points were mentioned:
1. Staff should immediately be consulted, but it was agreed to postpone this until concrete proposal(s) could be offered.
2. An individual roster, such as is used at Amsterdam, was not generally favoured.
3. Disadvantages of a unified roster were listed thus:
(a) Increased road traffic if all Control Staff arrived and left simultaneously.
(b) Rest-room facilities, already inadequate, would not be improved.
(c) Increased Locker-room congestion; it is already bad.
(d) Increased Canteen congestion, similar to the 1200 hrs; situation which already exists.
(e) The Briefing-room is not large enough, and no ready alternative is to hand.
(f) Noise -level at changeover times, and congestion, would increase in the Ops. Room.
No member of the S.G. could think of a single advantage of having a common roster; Mr. Drost said that as financial calculations would still have to be made on an individual basis concerning shift disturbance allowance etc. the only reason could be "managerial"!!
To obtain clarification of this, Management was consulted by the Chairman — the reason put forward was "to get a harmonized team". As the Brussels and Hannover sectors presented different problems and tasks, and they do not even have a common lower flight level, it was felt that the "harmonious" theory offered no advantages.
The meeting was adjourned until 17th. Feb., to give the respective Ops. Officers time to circularise full details of their rosters to all the S.G. members, and to explain the pro's and con's.

R.G. Evans

Problems of RTF communication Failure Procedures within the Eastern European Area

(Follow-up action to IFATCA Comm. 8 discussions in Nicosia, 1977)

1. When considering the above subject, it has to be noted that the USSR and Bulgaria are the only States in the Region prescribing that aircraft having encountered radiocommunication failure are not permitted to enter or leave their territories. Such flights would have to turn back to their point of departure.

2. Apart from being in flagrant contradiction with the world-wide provisions as specified in Annex 2, this procedure creates considerable difficulties to all States geographically adjacent.

3. It such requires adjacent States to establish detailed procedures to be followed by pilots experiencing A/G communication failure in order to maintain flight safety whereas these procedures on the other hand can not be uniform because of the need to take into account aircraft performance and local conditions.

4. For obvious reasons the above said results in a very confusing situation for pilots and operators who have to adapt to a completely different set of circumstances depending on where they found themselves during the course of their flight.

5. Even when taking into account the extremely rare occurrence of communication failure (no recorded case could be recalled) and the view of the USSR that this problem is "A purely national one and has no bearing on practical flight operations" the user organizations IATA and IACA, supported by IFALPA, express their grave concern at each annual Meeting.
In view of the fact that traffic density and certain limitations in the operating range of new aircraft are affected by the above procedures, an increase of existing difficulties and potentially dangerous situations is expected.

6. A specific problem raised by the above mentioned procedures is, that they prohibit continuation of flights having experienced communication failure in accordance with its current flight plan whenever it had not yet crossed the State border, but required a turn-back of that aircraft to an aerodrome not normally specified in the flight plan and this via a route and a level also not indicated in the flight plan. This generally creates a degree of uncertainty about the likely action taken by the pilot which, considering the circumstances in which the aircraft was required to operate, could result in a deterioration of flight safety.

In fact, with some types of aircraft now used for flights (especially in the USSR with its long routes), it could become impossible to complete the flight in operationally acceptable conditions because of exhaustion of fuel before reaching a reasonable alternate.
In some cases, where international flights are crossing the territory of the USSR on long-range flights (for example: SAS from Bangkok to Copenhagen) without landing, the fact that such a flight experiencing communication failure will fall down with fuel exhausted because of the procedure that it is not allowed to cross the USSR border again once it is over the USSR to turn back to the departure point and on the other hand is not allowed to land in the USSR – a real mouse-trap effect (in theory).

7. During the last Informal ICAO Meeting in Istanbul, 1977, the Bulgarian representative indicated that his administration is studying the matter with a view to improvement.
The USSR representative informed the Meeting that his administration does not feel that a change of the relevant provisions is required and, that they are, in their view, safe.

8. The above matter was subsequently brought to the attention of the EANPG at its 9th Meeting (paras. 3.4.4 to 3.4.10 of EANPG/9 – Report refer). At that Meeting the EANPG Member confirmed that the USSR did not plan to alter the procedure to be followed by civil aircraft when operating into or over the territory of the USSR and having lost radio communication with ATS units.
In view to that fact, the EANPG felt that, under these circumstances, the only way open to, at least, reduce the difficulties to a certain extent was to request adjacent States to agree amongst each other and in consultation with user organizations, on temporary relief measures which, while reducing possible ambiguities about the course of action likely to be followed by an aircraft in communication failure to a minimum, were, at the same time, providing for a maximum of uniformity regarding the course of action to be followed in each specific case.

The EANPG further formulated a resolution (9/3) on this subject.

9. One suggestion made with respect to the relief measures was that adjacent States may wish to state the airport within their territory at which aircraft are required to land, together with detailed procedures for approaching these airports. So far, the CSSR and Hungary have issued NOTAMs in this respect.

Erich Schyr
Regional Councillor CEN

Ops Room Personalities - No. I

The Flow Controller

The flow controller is a person
With a very fluent line in cursing
Who, faced with all those little lists
Feels like going home or getting p .... d
Instead he battles on alone
Abhorred by all and loved by none
Until, worn out with strain and stress
Says, he'd rather be an ATS
And lead a life of fun and pleasure
Like strip distributing at leisure
Tho' when confronted with a plan
To input, doesn't think he can
Deciding maybe after all
That flow controlling is his call
That heady feel of super power
Delaying aircraft by the hour
Cancel this one, make that refile
All said with fiendish, gloating smile
Until, at last his shift is done
And really it was all quite fun
So stepping gaily on his way
He lives to shirk* another day.

* In 10% of cases that should read 'work'

New Signaal Contract

Austrian Military Air Traffic Control Authorities place an order for Colour Radar Displays with Signaal.

The Austrian Ministry of Defence has awarded Hollandse Signaalapparaten, the Netherlands, an order for the "Operator Display System" for military air traffic control.
This order comprises 33 traffic control positions, auxiliary equipment and services, to a total amount lying between Hfl. 10,— and Hfl. 20,— million.

Colour Display

Very modern 50 cm four-colour displays constitute the heart of each of these traffic control positions, which are fitted with "touch input devices" and some conventional input media.

Each position contains its own minicomputer, which controls the displays and processes the inputs made by the traffic controllers.

Recent investigations have shown that the introduction of colour for data display offers physiological advantages, including a contribution to the safety of air traffic.

Braking action good! What does it mean?

by Aage Roed

World-wide statistics showed a remarkable reduction in the aircraft accident rate during the 1960-ties. That was good, but this broad type of analysis can also be deceptive since it does not sufficiently take into consideration the variation in risk levels between different flight phases and different types of operation. Therefore, in this type of statistics, operations with reduced levels of safety may appear only as a low average accident rate or as a stagnation of the rate reduction. Continued flight safety improvement requires better identification and analysis of the more hazardous operating conditions.
In Scandinavia, operations from slippery runways is a typical problem, especially during the winter with storms and, in some places, more than 20 hours of darkness. In such conditions it can be essential to know the runway friction when making the decision to land. "Braking Action Good!" should then sound like a reassuring report from the control tower. Unfortunately, the term can, as you know, be directly misleading and thus very dangerous.
A survey was made among airline pilots operating in Scandinavia and Finland regarding the experienced braking action compared to the reported one. Analysis of this material showed that on an average, the friction was felt to be lower than reported in 17% of the recorded cases.
Let us first look at the definition of "Braking Action Good". This term is used to denote measured friction coefficients above $\mu = 0.4$. It was developed by interviewing pilots about the stopping capabilities of their airplanes when landing under various runway conditions. The replies were compared with friction tests made by means of a friction-measuring trailer. The airplanes were not performance-limited. Aborted take-offs were not tested. Assume now that the measured friction value is correct and equal to $\mu = 0.4$, then, if aborting the take-off at V_1, you may go over the end of the certified runway with 70-80% of the V_1 speed. Clearly, "Breaking Action Good" does not, even when it is correctly reported, give you sufficient information to judge the risks involved in operating from fields where you are performance-limited. For operations from short runways in adverse weather conditions, a new reporting method related to the true performance of the aircraft is, therefore, needed.

Now, we know that the reported braking action is not always correct. An important reason for this was well-demonstrated by the braking tests at Arlanda. The concrete runways at the airport were so smooth that they needed only a very thin film of water to become as slippery as ice at moderate and high speeds. At the same time, the low speed braking action could be quite good. In a typical test run, the friction coefficient dropped from 0.6 at the standard μ-recording speed of 65 km/h (35 kts) to 0.1 at speeds above 120 km/h (66 kts). Under these conditions the recorded low speed braking action obviously may give a false picture of the runway condition. Note that the aircraft braking action may not drop as drastically as that measured by the Skidometer due to differences in waterplaning speeds.
The most important conclusion drawn from the Arlanda tests was not that it is difficult to measure and report friction correctly when the runway surface is smooth and wet, this was obvious. Rather, it was concluded that a smooth surface texture is not suitable for wet runway operations, especially since the braking efficiency of the anti-skid systems of many aircraft was found to decrease sharply when the ground friction was low. Special runway roughening equipment was, therefore, brought in from Switzerland, and in a short time, at a cost far below the cost of an accident, the runway surfaces were reworked. As a result, the wet runway friction increased to above 0.8 at 65 km/h and to approximately 0.5 at high speeds. One winter operation with the new runway surface has given very satisfactory results. With the excellent snow-removal equipment at the airport and the policy of "removing the snow as it falls" it has been possible to maintain safe runways throughout the year. No complaints against faultily reported braking action have been received.

It is obvious that the efficiency of the roughened surface would be reduced if the runway surfaces were poorly drained so that water could gather in low areas or remain at one side of the runway in crosswinds due to too small cross-section curvature (at least 1.5% is required). It is also obvious that thick layers of paint should not be applied on the roughened surface.
Runway surfaces with coarse macro- and micro-texture is a basic requirement for safe operation on wet surfaces. It is surprising to see that runways are still constructed of material such as soft chalk-stone that will become polished and create a very slippery surface after a short period of use.
Pilots do not always apply full braking when asked to do so. Full braking is an unusual action for a line pilot and often requires an uncomfortable foot position. This may be a pilot-training problem.
Unfortunately, it does not help very much in winter environment to have good runways, fine friction-measuring vehicles and the best snow and ice removal equipment if the personnel concerned does not know when to take action or how to inform about possible problems. We have found many a case when the difference between reported and experienced braking action was caused not by incorrect measurement but rather by weather changes between the time of measurement and the time of landing.
In one noteworthy case, a suspicious pilot tested the reported "Braking Action Good" immediately after touch-down. Finding that he agreed with the report, he applied soft braking and used no drag chute. What he did not know was that it had snowed on the far one half end of the runway. The day, and the executive jet, was saved by a hairbreadth after a ground loop at the runway end.

Obviously, there is an educational problem involved. The tower should have informed the pilot about the problem. However, there may also be a need for methods that can predict risk for sudden changes in runway slipperiness. Our meteorologists have such methods under development.
One has every reason to pay respect to those people who developed the existing braking action reporting systems. They took a great step forward. But now is the time to develop reporting systems that can give better information, runways that are safer when wet, friction-measuring equipment that give more reliable information at reasonable speed ranges, improved anti-skid systems, and better methods for educating everyone involved in the slippery runway operations. This can contribute to continued reduction of the world-wide aviation accident rate.
If we do not achieve this, we shall have to continue living with cases where the landing is made in 10 kts tailwind because "Braking Action Good" is reported. The pre-selected spoilers do not extend since the main wheels do not spin up because of aquaplaning. The aircraft continues far down the runway while manual spoiler is selected. The spoiler is not retracted by the pilot in command when he decides to go around. The co-pilot is locked in place by his shoulder straps when he tries to throw himself forward to reach the spoiler handle which he, after a delay, fortunately reaches as the aircraft goes barging through the approach lighting on its potentially catastrophic go-around. The ultimate in flight safety requires good total system analysis. It is not so difficult to do. Most of the know-how is available.

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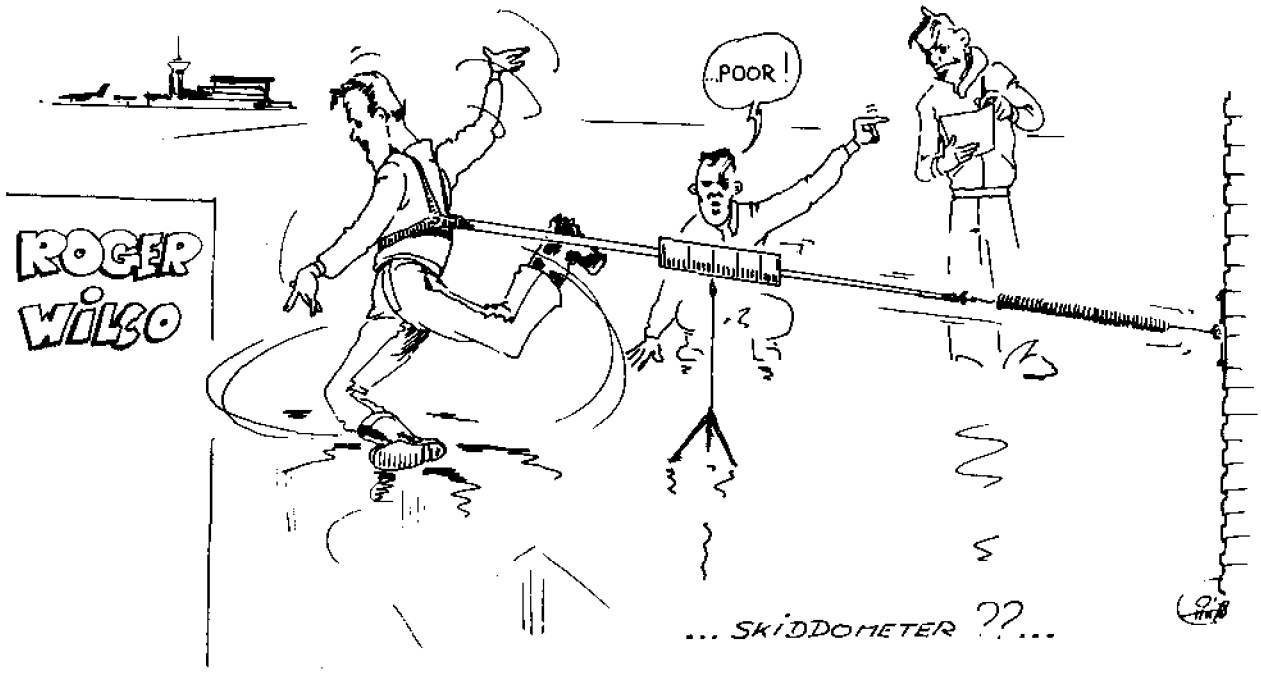

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