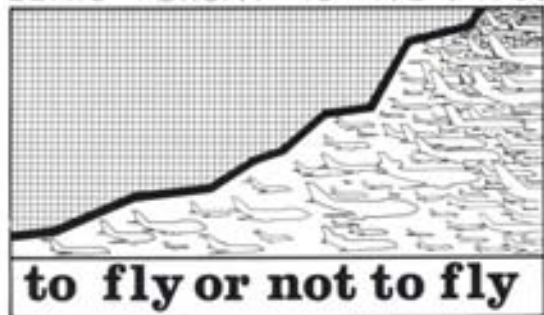


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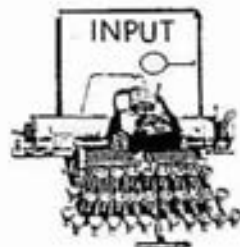
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EDITORIAL

by Patrice Béhier



The Air Traffic Controller as a Key Element in Aviation Economy.

When one is aware that one minute flight of a B747 costs about \$ and that ATC related operating costs of an airline amount to a high percentage of total costs, we then realise fully the direct impact of controller's actions over airline and air operators financial status.

It is only now after the summer '87 chaos and the present and foreseeable increase of traffic that the airline managers are realising that they will not be able to expand without a proper ATC system in Europe. They are now aware that the ATC complex is greatly deficient and that the air traffic controller is a key factor, trying his best to alleviate the inadequacies of the system.

It is now obvious to all parties, that a crisis is being reached and that short term solutions are not enough.

Depending on the country, some of the present problems are the following:-

- Airspace and airport saturation
- inadequate equipment
- too long routes
- uncoordinated ATC policies
- lack of personnel
- controllers' unrest, morale and motivation problems
- discrepancies in controllers status
- etc....

The airlines are planning considerable expansion for the coming years, to such an extent that traffic is expected to double by the year 2000!

These plans include renewal of fleets with an increase in the number of aircraft, increased frequencies of many flights, increase of I/T traffic with emergence of many new charter

airlines and, last but not least, preparation for 1992.

It is very contradictory, to say the least, to see that European trade barriers (and many others) will disappear in 1992 and that Air Traffic Control which, by essence, is international, will remain stupidly and unproductively constrained by the old nationalistic, short sighted borders.

The air traffic controllers have to carry on their shoulders and at the expense of their nerves, the deficiencies of such an archaic system. They have to balance SAFETY versus ECONOMY and at the same time still "fight" to be recognised and sometimes to obtain the proper tools for the job.

It is with great pleasure that I reproduce the presentation made by Captain Gaebel of Lufthansa on this subject. I can only urge all readers to read this excellent article which summarises all the problems of today and the possible solutions in a very clear and concise manner.

don't
forget

(WRITE IT DOWN!)

**NEXT COPY
DEADLINE:**



30 JUNE 1988

AN AIRLINE'S VIEW OF THE ATC SYSTEM OF THE FUTURE

by Captain Martin Gaebel,

member of the board
Lufthansa German Airlines

"The needs of our customers take every priority. They determine our actions. We offer our customers punctual, reliable and safe air services within Germany and to the most important points of the world!"

Ladies and Gentlemen, what I quoted was the first of our four company principles. Punctuality, reliability and safety are, indeed, the cornerstones of an airline product if it is to fulfil its public duty. And - to put it into a nutshell - this is all what I am talking about today, when I give you my airline's view of the ATC system of the future. We have to secure a public service on which our European economy heavily depends.

1987 was a two-faced year which should teach us two lessons:

- Civil aviation is a growth industry.
- The pace of development of the aviation infrastructure (particularly in Europe) has fallen way behind the dynamics of the airline industry and its markets.

1987, spurred by the dawn of a more liberal regulatory regime in Europe, has produced strong growth rates for the airlines. Lufthansa carried 18.4 m passengers - that is 10.7 % more than last year - and 727000 tons of freight representing a plus of 14.5 %. Certainly a boom year in terms of transportation and definitely a reflection of the upward trend of traffic volume produced by the airline industry.

So far so good? - Well, 1987 also was a year of discontent for both the airlines and their passengers and - interpreting the subdued noises from our colleagues in the ATC Centres and towers correctly - for European air traffic control as well. Punctuality rates plummeted particularly for the central European airlines to an alarming low. Because of congested airports and air space my airline's

aircraft suffered inflight holding delays of 5200 hours - this is 2500 hours more than the year before. Total additional cost to Lufthansa was some 50 m Deutschmarks.

"The sky's the limit". - This headline of Flight International magazine of November 1987 gives a conclusive message: Air traffic growth in some already busy sectors of Europe's sky during the past year has been such that in many parts of Europe the traffic demand already exceeds the capacity of the system. And "Flight" carries on - I quote: "Operating the ATC system close to its limits all the time obviously raises safety questions, but less immediately obvious is the fact that these artificial limitations on business opportunity in the sky may make the European Community's air transport deregulation, planned for 1992, virtually meaningless. - Unquote". Or to put it into the words of our company chairman: "Those who open up the sky should bear in mind the consequences".

The Airline industry will continue to grow. Experience has shown that demand for air transport has increased at twice the rate of national social products.

Figures given by Eurocontrol for Western Europe clearly indicate the trend:

- 1986 : 3.07 m civil aviation movements
- 1987 : 3.30 m civil aviation movements.

This represents an increase of some additional 300 000 flights (plus 10 %).

International aviation organisa-

tions expect airline traffic to double until the year 2000.

How real this development is can be seen from the increase in the number of flights submitted to airport schedule coordination in Germany for summer 1988 compared with 1987:

- In Frankfurt the number of flights submitted for scheduled coordination in 1988 increased by 18.4 %
- In Munich by 17.0 %
- In Düsseldorf by 15.2 %

We in Lufthansa anticipate our fleet to grow from some 150 aircraft presently to 250 in the year 2000 (this includes our regional air services).

The changes in the regulatory regime - either implemented or yet to come - will foster competition. The national regulatory regimes - often of a protective nature - will disappear. Less bureaucracy and more flexibility will stimulate air traffic to seize new commercial opportunities. Aircraft of smaller capacity will seem to be the right answer for new entrants into the market.

This vision has already begun to turn into reality. The infrastructure in 1987 had often been utilized to its limits. Apart from the delays already mentioned this had

- caused a waste of fuel
- put a burden on the environment
- inflicted a loss of service quality and
- caused damages to thousands of passengers.

The level of demand placed on the system which experts predicted for 1991 has already become reality in 1987. So we have fallen behind four years in terms of planning.

The same holds true for the airports. Based on a medium growth rate AEA already forecasts the saturation of all major European airports for the mid-nineties.

What conclusions do we have to draw from all this?

- We have arrived at the threshold of a new dimension for civil aviation in Europe. The inadequacy of the system - particularly the ATC system - has become apparent.

- Relying on local or national solutions by individual parties within the aviation system will not take us any further. If we do not wish to see

aviation strangled we will have to tackle the problem in two areas

- technically and politically.

To cope with the challenges of the future the capacity of the ATC system must be significantly increased. The key to putting more aeroplanes into the available airspace is technology.

Many of our airliners presently in use are equipped technically in such a way that they could contribute to a far more flexible and efficient air traffic control. Looking ahead to the year 2000 our modernized fleet will have an even greater potential to facilitate an improved flow of air traffic:

- In the vertical dimension our aircraft will climb faster and reach higher operational levels even with full loads over short distances.

- The availability of Area Navigation Equipment will allow routings free from the sitting constraints of ground-based facilities, thus permitting maximum flexibility and a much better utilization of the airspace.

- Much of the present routine communications can be handled via Data Link.



- A large number of our aircraft will have Flight Management Systems capable of 4D navigation. The full exploitation of this capability will require a sophisticated Air Traffic Control System which in turn is able of taking the factor "time" into consideration allowing extremely precise trajectory predictions to be made.

All these technological developments on board aircraft must be taken into account in developing the future ATC system concept in order to reduce the already broad gap between aircraft capabilities and the ground system.

From an airline point of view, and considering the substantial growth of

traffic foreseen, it is important that the future ATS system design should assume that all airspace is useable.

It is also important in a dense and complex traffic environment such as Europe that the airspace organisation should permit all public transport flights to be performed in controlled airspace.

The responsibility for the avoidance of collisions between aircraft in controlled airspace must rest entirely with ATC. This responsibility cannot be shared. The principle of "see and be seen" for the avoidance of collisions is no longer acceptable in a highly sophisticated ATC environment with enhanced utilisation of airspace. Airborne Collision Avoidance Systems should not become an integral part of ATC. They will no doubt be a very useful adjunct to the ATC system, but should only be regarded as a last resort in the event of contingency situations and/or system failures.

Full exploitation of RNAV capabilities will require the complete reorganisation of airspace. The presently fragmented airspace and the somehow lavish segregation of civil and military traffic must be replaced by an airspace structure and an integrated ATC organisation that will better serve the needs of both civil and military users of the airspace. I have some doubts in this context, whether there is a real necessity for the enormous amount of tactical flight training by the Air Forces in some parts of Western Europe's airspace which is already heavily loaded and very often saturated, or whether a substantial amount of such training could not be conducted elsewhere or possibly using simulators.

I recognize that there are limits to which ATC system capacity can be developed and that no system can be designed that will be capable of absorbing the absolute traffic peaks. An efficient Air Traffic Flow Management will therefore continue to be required in the future. However, it should under no circumstances be used as a substitute for an improved ATC system.

Planning and implementation of the future ATC system should be undertaken in close cooperation with the users of airspace. Adequate lead-time should be provided in respect of airborne



equipment requirements. Implementation of the new system will be an evolutionary process. It must be coordinated and timed in such a way as to ensure a fully coherent system throughout its development.

The provision of enhanced system capacity, the development of a new ATC system and the accompanying technical infrastructure will - no doubt - require very large sums of investment. These will have an impact on user charges.

Lufthansa presently pays some 230 m Deutschmarks for air navigation charges per year. Including landing fees and other airport charges our bill of charges amounts to some 1.06 bn Deutschmarks - the second highest item in our annual expenditure budget. I hope you can understand our concern.

It is not an undue request when the airlines ask the States concerned in their attempt to recover the cost for air navigation facilities to look at the economic and fiscal benefits of aviation for their national economy as a whole.

Coming to the political field in which the problems need to be tackled I can only warn that the situation will not simply go away or might be overcome by market forces or might resolve itself with concepts of yesteryear.

The community of European states must recognize that they are dealing with an issue which concerns the well-being of our continent. Some of the problems can be solved nationally but the more serious problems will require a common political will.

- On the flow of traffic: Flights from Scandinavia to Spain or from Britain to south-eastern Europe use West German airspace which has comparatively few airways. The result is that we have a concentration of traffic where there is particularly

little space available. This must be resolved on an international basis.

- With the current fragmented airspace structure in Europe, the requirement for ATC coordination is excessive. On a single flight from Frankfurt to Madrid, for instance, an aircraft has to be cleared by seven different control bodies. It would therefore seem logical that the idea of Eurocontrol as a supranational ATC authority for Europe be revived, allowing the development of an Air Traffic Control and airspace organisation better tailored to the needs of the different airspace users and the traffic flows in the region.

- In developing the ATC system of the future, its system concept and its technical infrastructure the Governments must not lose sight of the human element involved.

- If the ATC system is to be efficient, it requires an adequate number of highly qualified and motivated staff. Training, working conditions and remuneration of ATC staff must be congruent with the importance of their jobs.

- Whilst air traffic during the past decade has increased significantly, the number of ATC controllers in my country only increased by 6.3 %. The budget commission of the German Parliament did not exempt ATC when they recently proposed a one-percent staff cut across the board for all Government agencies. Despite anticipated traffic growth they were prepared to cut the number of ATC controllers by 35. We all hope that this will not come into effect.

1988 and the years to follow are going to be crucial. We all have seen the writing on the wall last summer and autumn. I can only hope that the signs have been recognized. The message is clear:

- When you are going to remove trade barriers and boundaries you cannot protect your own little garden.

A coordinated political initiative at European level is urgently required to

- develop and expand the structure of ATC,

- to harmonize the infrastructure,

- to restructure European airspace,

- to improve cooperation and coordination between all the authorities involved,

- and to establish Eurocontrol throughout Europe as a supranational ATC body.

We in the airline industry are willing to work towards a closer cooperation for the benefit of aviation in Europe. We do this for the sake of our customers and our economies.

If we don't act soon we might all become victims of Murphy's law of thermodynamics:

Things get worse under pressure.—



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CYPRUS DISCOVERED

by Kees Scholts

On a familiarization flight to Cyprus early in January, we found an island with everything available to guarantee some lovely days.

The flight from London Heathrow with CYPRUS AIRWAYS took some 4 hours 15 minutes, together with a very friendly crew. This friendliness, we discovered, is typical for the Cypriot people. We flew from London to Paphos and then to Larnaca on an A310. The island has many things to offer: mountains (skiing is possible in winter since the Troodos mountains reach a height of 3700 feet); there are also beaches, quiet resorts, discotheques, good shopping facilities for agreeable prices (especially shoes) and history. A trip to Nicosia is certainly a "must". The northern part of the island is "inaccessible to visitors due to occupation by the Turkish army since the summer of 1974 as you can read on all maps of the island.

We found a good hotel in Larnaca, the SUN HALL hotel where we benefited from a 20 % discount. The room was overlooking the Mediterranean with a yacht-harbour and a nice sandy beach. We were even more lucky in Limassol.

AN APOLOGY

In the previous issue of INPUT (4/87), an article entitled "ERIKA ACTIVE" was credited to Captain G. Klein in error. The author was in fact Olt. G. Klein, to whom we apologize, in the hope that the unintentional promotion will soon be achieved

The PEGASUS BEACH Hotel, run by Mr. Lazarou and his Norwegian wife offered us a very good price for accommodation (low season some Dgl 50,- for a nice apartment). The telephone number is 09-357-51-21320. In Limassol we found many nice restaurants and bars. The local dish called "mese" is excellent.

Arriving in Cyprus, Larnaca, you will find some car-hire firms in the arrivals hall of which FIVOS rent-a-car will make you a good offer with unlimited mileage.

Average temperatures:

Dec - Mar 15 - 19 degrees

Apr - May 24 - 29 degrees

Jun - Sep 33 - 38 degrees

Oct - Nov 25 degrees.

Cyprus is, certainly worth a visit. You will go back!

CYPRUS AIRWAYS runs a fleet of 9 aircraft at the moment:

- three A310 (another one to be delivered in December 1988)

- three B707;

- three BAC-111-500.



The latter will be replaced by 8 A320s in 1989/1992 period. CYPRUS AIRWAYS was amongst the launching customers for the A320. Future planned destinations include Amsterdam, Düsseldorf and Brussels.

K. Scholts and G. Debruyne.



"MAJOR CHANGES IN BOTH HARDWARE AND SOFTWARE ARE TO BE EXPECTED IN THE OPS. ROOM IN THE NEAR FUTURE"....

A VISIT TO THE UTAH AIR NATIONAL GUARD

by Captain A. Schuhmaier

In October 1986 I had the opportunity to participate in an official visit to the 151 Air Refueling Group "Utah Air National Guard" (ANG) at Salt Lake City USA.

The 151 AREFG operates eight KC135 Stratotankers stationed at Salt Lake City International Airport. Attached to the 151 AREFG are a civil engineering squadron, two tactical control flights (103/109 TCF) and the 299th Range Control Squadron at Hill AFB.

Our host unit had prepared a very interesting agenda for our visit, comprising:

- a tour through Salt Lake City Air route Traffic Control Center (ARTCC);
- a visit to Salt Lake City and Approach;
- a visit to the local ATC at Hill AFB;
- a visit to 299th Range Control Squadron;
- three orientation flights onboard a KC135 refueling B1C, KC10 and F16 aircraft.

Salt Lake ARTCC

It is located in the immediate neighbourhood of the ANG installations. A little walk brings us to the building. The numbers of microwave-antennas on the roof give insiders already an idea of its purpose.

The superintendent of the facility gives a welcome address and Head of Operations can start his briefings. Salt Lake City ARTCC has the largest area of responsibility of all US-ARTCC's. It ranges from the US-Canadian border in the north to the middle of Nevada in the south and comprises the States Utah, Idaho, part of Oregon, the eastern Wyoming, the northern Nevada and the western parts



of Colorado. Vertically it extends from ground up to FL 600.

The area of responsibility of SLC-ARTCC is divided into 21 control sectors. Each sector is manned by a radar controller, a coordinator and a flight data assistant. Eleven remote radar sites and 20 remote TX/RX sites provide for the required radar- and radio coverage. The computer system provides for "Multi-Radar-Processing" but for "Mono-Radar-Tracking" in a dynamic mosaic environment (e.g. only the computer knows the current boundaries of the radar mosaic). The entire system is called "NAS-stage B".

Being familiar with the BFS-DERD system, the displays look quite similar. But indeed, NAS is more or less the mother of DERD and ZKSD. As in ZKSD, flight plan processing is conducted at a central FAA computer complex to which all civil/military ATS-units, all AIS-units and all other facilities providing or requiring aeronautical data are connected. Merging of flight plan and radar data is performed by the local computer complex. Although there is no flight plan navigation as in MADAP, flight plan assisted tracking is possible.

Controller/Computer communication is done by use of keyboards. By watching Salt Lake controllers at their work, I had the impression that there is a ratio of about 70 percent input work and 30 percent actual control task. This impression was

confirmed by talks to the controllers concerned.

There was another interesting impression. Though they have no "short term conflict alert" as we have, nevertheless, the computer systems log any infringement of separation standard (5 NM/1000 resp. 2000 ft) and give an alert to the supervisor who in turn has to investigate immediately whether or not an actual conflict situation was imminent.

In this context it should be noted that FAA regulations still allow for VMC operations without any limitations. But if an actual conflict between IFR flights has occurred - even without complaints by the aircraft concerned - the controller concerned will be dealt with as follows:

- first conflict per year: written and recorded disappreciation.
- second conflict per year: one week "holiday" without payment.
- third conflict per year: fired!!!

The readers of this article may judge by themselves whether or not this procedure increases controllers motivation. Each FAA-centre and SLC-ARTCC, has its own simulator for controller training. The simulator is independent of the live system and is located outside the operations room. It is capable of simulating two sectors of the centre concerned at the same time. To run the simulator, FAA has contracted a private company which in turn has hired a number of former PATCO controllers. This sounds crazy but the reason is simple. By Presidential order it is prohibited for any Federal Agency to employ any of the PATCO controllers fired during the 1982 walk-out affair. By that construction it was possible to work around the President's order and use some of the experience of the fired controllers for training new ones. For theoretical training, a number of personal computers have been procured. The required theoretical knowledge is stored on discs and presented to the students in form of programmed lessons with progress control. It is mandatory for all trainees to spend a number of hours per week on the computers.

Salt Lake City International Airport (Tower and Approach)

SLC-International Airport is located in the northeast of Salt Lake City near to the southern shore of the Great Salt Lake. The airport has two parallel north/south runways (35/17). Western Airlines uses SLC as a HUB. SLC Tower has to provide its service for an average of about 1.000 movements per day. SLC Approach provides approach control services for SLC and Hill AFB (located about 20 NM north of SLC). For that purpose, ARTS 3 (Automated Radar Terminal System Level 3) is available. This system uses the radar data from one or more ASR sites, the flight plan data of the central facility and displays digital data such as SSR tracks with label blocks and analogue data in the form of primary targets. The correct association of a primary target with the digital information is still the controller's task even if doubtful situations are extremely rare.

SLC Approach operates 5 working positions, 3 for SLC, 2 for Hill AFB. The main problem of SLC Approach is common to all international airports within the USA. The problem of deconfliction between IFR traffic departing arriving at SLC and uncontrolled VFR traffic generated by small municipal airfields in the immediate surrounding, is still unsolved.

Hill Air Force Base

Hill AFB is located about 30 NM north of Salt Lake City nearby the town of Ogden on the northeast edge of the Great Salt Lake. It is the home of the 388th Tactical fighter wing operating about 80 F16 aircraft.

A large logistical distribution centre for military aircraft spare parts provides for continuous traffic with civil and military cargo-aircraft. A test squadron or air force equipment is an additional airfield user. Furthermore, one KC135 of the 151th AEF is held on quick reaction alert. The local ATC comprises the tower and two GCA/PAR working positions. As an average, 400 movements are to be handled per day.

As at SLC Approach, the colleagues here complain about problems caused by General Aviation aircraft generated by nearby operated small municipal or private airfields.

The 299th Range Control Squadron

The biggest surprise to me during our visit was the 299th Range Control Squadron "Glover Control". To be honest, I expected some sort of tactical radar unit I had seen already a hundred times. But what we found is really exceptional for the United States. "Glover Control" is in fact both, a tactical radar unit and an ATC en-route facility and is also responsible for the Utah Test and Training Range (UTTR). This airspace has a size of about 170x 80 NM and comprises the western part of Utah (above the Salt deserts) and some parts of Idaho, Wyoming and Nevada. It extends from ground to FL 500 and superimposes the ground ranges of Hill, Wendover, Desert Test Centre and Dugway Grounds. Within the ground ranges, a large number of air-ground targets are available. For instance, Wendover is a fully operational dual runway airfield normally just used as an air-ground target but it can host a full flying wing at any time. Furthermore the UTTR is covered by a sophisticated telemetric system to meet the requirements of the test squadron. The TWR is covered by two long range radar sites. For ATC purpose, radar data are presented in digital format as plots and tracks on four-colour displays. For tactical purposes, analogue display is available.

It is almost superfluous to mention that Glover Control is linked to the FAA central flight plan processing system and fully compatible to NAS and ARTS with automatic handover possibilities to SLC-ARTCC and SLC-Approach.

Since Glover Control is operated by the Air National Guard, the standard recruitment procedures of the "Guard" are applicable. If we Europeans think about the "Guard", we do it always with a slight smile on the lips and with a thought of "hobby soldiers" in the back of our mind. But there we are wrong. Indeed, the basic recruitment system is identical to the Swiss milit-system on a voluntary basis. But besides those "parttime-soldiers", all key positions are manned by full time personnel.

About 50 percent of the control staff of Glover Control are "full-timers" and in this role, civil employees of the State of Utah. Of course, all controllers must be in possession of valid FAA en-route licences.

To sum it up. I have not seen any other facility where closer interface between Tactical Support and Air Traffic Control has been realized in an almost ideal environment.



SPEAKERS' CORNER

by Geoff Gillett

On January 14th, EGATS held its first Speakers' Corner event in the "Lippe Radar" Officers' Club, adjacent to the Eurocontrol UAC, Maastricht Airport.

Approximately 50 persons attended this informal evening where 3 speakers gave an informal talk on subjects of interest to ATC personnel.

The first invited guest was Mr. Nigel Corrigan, the inventor of the CONTRAN Unit, a device designed to prevent simultaneous transmissions and the blocking of ATC frequencies. For those new to this device, it was interesting to see a practical demonstration of how relatively simply, the increasing problem of R/T congestion can be overcome. Our colleagues from Maintenance Division also expressed an interest in this device and it is hoped that with the pending replacement of our R/T facilities, the Maastricht UAC might become the first ATC Centre in the world to be equipped with conflict-free R/T. In the meantime, DAN-AIR has two aircraft equipped with prototype CONTRAN Units for operational evaluation.

Secondly, it was the turn of Mr. Moeshart, former Deputy Director of the Maastricht Centre, who gave a resumé of a book which he has produced on the history of ATC, a mammoth work which is packed full of interesting material, both written and photographic. He is hoping to find a publisher for this book in the Dutch language or, if a translator can be found, in English.

Next, it was the turn of Mr. G. Horsman, Supervisor Team D - Brussels Sectors, to bring us all up-to-date on the progress of the Early Termination

of Service for Controllers. A very detailed description was given on the history (more than 10 years) of the case for giving Eurocontrollers the possibility of terminating their service prior to age 60, as already happens in many of the Member States. It was concluded that the short term prospects are not very optimistic.

The final speaker of the evening was Dr. Stekelenburg of the "Bedrijfs-geneeskundige Dienst" Heerlen, well known to ATC personnel for his annual examination of our ageing bodies.

In a light-hearted presentation, he gave some information on the state of health of controllers compared with other workers and had some interesting views on stress and some critical comments about air-conditioning systems.

Mr. Walmacq, Head of Maintenance Division, then informed the EGATS meeting of the planned changes foreseen for the air-conditioning of the Maastricht Operations Room.

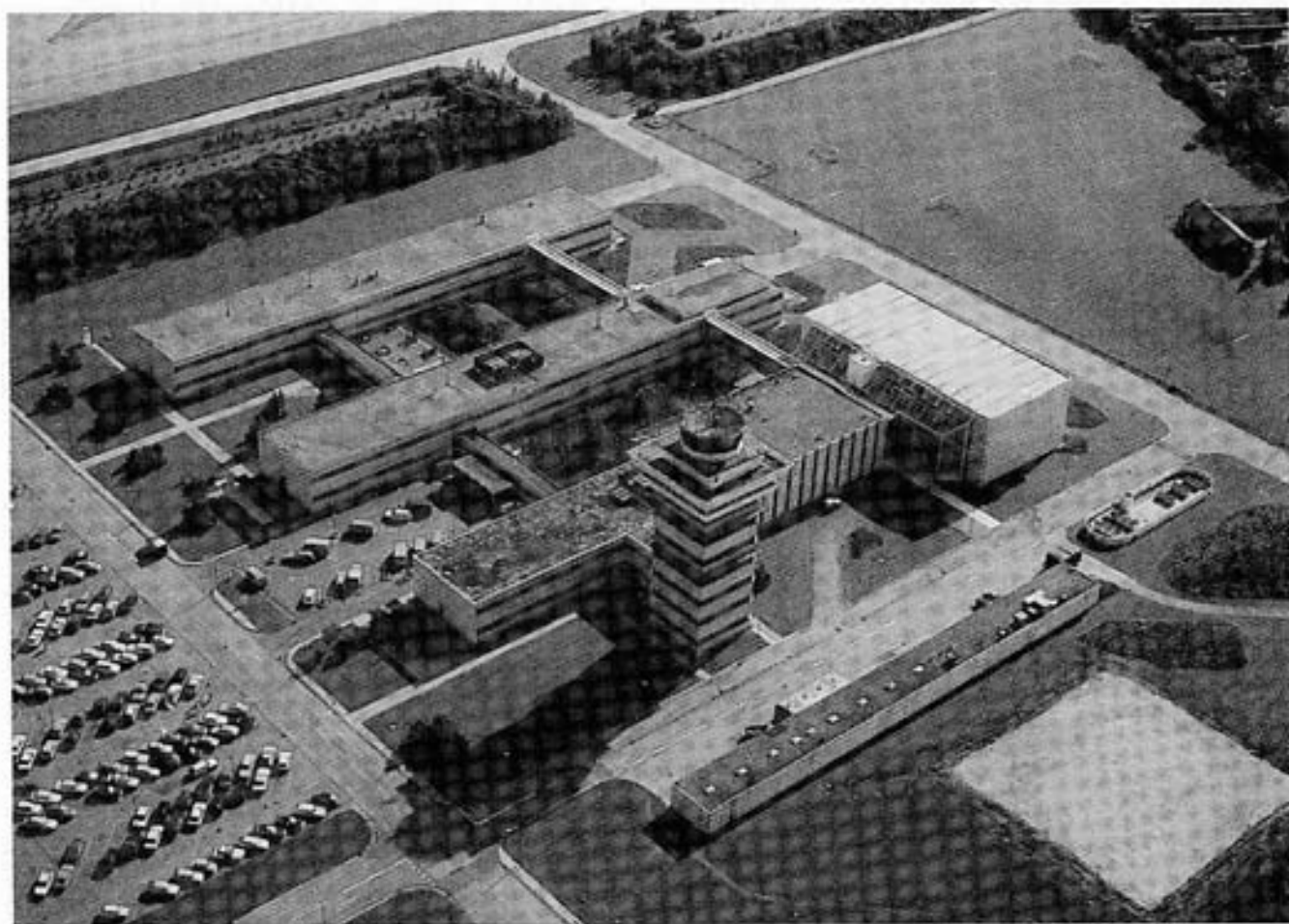
Following some food accompanied by several barrels of beer, the rest of the evening was spent in informal discussion among the members and the visitors.

It was gratifying to have the Heads of Divisions of the Maastricht Centre present at this event and EGATS would like to express our appreciation to OTL J. Faber, Commanding Officer of "Lippe Radar" for hosting the first of what we hope will be a regular get-together of military and civil colleagues.



THE NEW COPENHAGEN ACC

by Philippe Domogala



On 11th February, 1988, I was invited to visit the brandnew Danish Air Traffic Control Centre in Copenhagen. Situated in a new glass-and-steel functional building attached to the old ATC, the new Operations room is attractively designed. The walls are made of acoustical panels, the floor is covered by a carpet and everything is made of "quiet" colours. A sophisticated system also provides "daylight type" indirect lighting.

Another of the distinctive features of the Copenhagen System is that the controllers themselves define the system (not an outside consultant firm) and they were allowed to modify it until one week prior acceptance (1 February 1988). This was praised by all parties, controllers, Danish CAA and manufacturers. This ensured an acceptable and workable system to be

designed in a relatively short period of time. The telecom part of the system has been made by TELI of Norway for the telephone and by the Danish CAA themselves for the R/T. The color-TV information system is made by a Danish Company, ISS Videotex.

The price of such a system? All-in, that is including the building, the ATC system and the training simulator : 330 million Danish Kroner, or about 50 million US \$, less than half the price of a Boeing 747 ...

Each controller received between 10 and 12 days of training on the new system which became on-line on the night of 16th to 17th February, 1988.

The ATC system was built by Thomson CSF using some interesting new features and took 3 years to be installed (from the date of contract

signature to operational delivery). The system is based on the new DATA GENERAL 32 bit computers with 16 Mb of active memory. There are four of them. One for main, one for stand-by, one for reserve and development and one for the training simulator. They feed twenty five working positions and nine

military zones, frequencies, notams, flow, etc... The maps can be so accurately drawn that they are replacing the standard paper ones. One of the main novelties of the system, however, is in the invisible software.

The programming of the system is written, for the first time in ATC, in



training stations, the latter being located in a separate room. The system can handle up to 350 radar tracks and store 4000 flight plans. Radar information is fed by four primary and six secondary radar heads (some of them Monopulse) using multi-radar techniques. The radar scopes are standard large random synthetic displays. The dialogue controller/ system is done via a new type of touch-input-device (TID) of the plasma type (you touch the screen for contact).

Each working position has its own processor, so in case of main computer failure, some basic information is still available on each working position. Above the consoles are colour TV screens used for electronic information: maps meteo, status of

the ADA language. ADA is a new language adopted by the Pentagon among others for the SDI (Star Wars) programme. The advantages compared to the "old" Fortran, Pascal or Assembler languages are numerous. First it is a highly structured and standardized language that allows the work to be broken down so that different persons, or teams, in different places, can work on it at the same time. Secondly the program constantly "verifies itself" so that "errors" or "bugs" cannot be propagated into the system and can be corrected at source. This feature is of particular interest in ATC where reliable software can minimise system failures.

The next big project of Thomson, the Belgian ACC of Brussels (CANAC) will also be programmed in ADA.

SEMINAR ATC 2000 LUXEMBURG

The event took place at the Eurocontrol Institute of Air Navigation Services, Luxembourg on 23/24 February and was very well attended by many persons from the top ranks of aviation authorities, industry and some airline representatives.

No other participation of controller's associations was invited or present. The other controller was Mr. Riedle from Munich representing the Bundesanstalt für Flugsicherung.

The seminar consisted of half hour lectures/speeches followed by a short question session. The questions/discussion time, however, was insufficient. The chairman only allowed two or three questions or remarks after each speaker due to time constraints.

The Minister of Transport for Luxembourg, Mr. Schlechter, opened the meeting, followed by a speech by the Director General, Eurocontrol. As reported the schedule was very full consisting of six speakers in the morning and five in the afternoon. There were some very technical subjects such as Mode S and further automation of specific ATC tasks all with a view to increasing the capacity of ATC sectors and approach control. Some of the interesting subjects covered were:

- "Air navigation in the North Atlantic region; ways of improving Oceanic ATS" presented by Messrs. Carvalho and Valadares of DGAC, Portugal.
- "Funding of Aviation Projects by the European Investment Bank" by Mr. Deeley of the EIB, Luxembourg.
- "An Airline's view of the ATC system of the future" by Mr. Gaebel of LUFTHANSA, being very much in favour of the EUROCONTROL concept.
- "A total approach to a revised European Air Transport system" by Mr. Egger of the CAA Denmark - a very different approach indeed.
- "Optimum On Line Handling of Air Traffic over Western Europe" by Messrs. Benoit and Swierstra of Eurocontrol.
- "The COMPAS system- Computer Assisted Sequencing and Scheduling in Air Traffic Control" by Mr. Adam of DFVLR

by Kees Scholts

from Germany.

A very sophisticated system as it was presented and which has to be operational (with the consent of the controllers) in spring 1989. If this system would have been presented by a salesman instead of this very able

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engineer, they would have had a possibility to sell some systems immediately to the audience. It looks very promising. The seminar finished with:

- a "Crystal Ball Presentation for Western Europe 2010" by Mr. Maignan of Eurocontrol Brétigny, whose presentation was indeed crystal clear and very interesting.

On the second night, a gala dinner was held in the Luxembourg Pullman hotel in order to celebrate 25 years of Eurocontrol.

* Editorial note:

I will try to publish some of the more interesting working papers in the coming issues of INPUT Magazine. In the meantime for those who are interested some copies of the papers are available from the secretary.

25th EUROCONTROL ANNIVERSARY

REPORT ON THE ANNUAL NLTF MEETING

— by Paul Hooper —

Once again our Icelandic colleagues did us proud. Despite their limited number they managed to provide visitors to the 11th annual NLTF meeting with an even balance of professional discussion, eating, drinking and sightseeing; hospitality second to none.

This annual get together of the constituents of the Nordic Air Traffic Control Assistants Association (N.L.T.F.) is primarily used as a platform for exchanging information and ideas. All the delegates are active ATC Assistants and most are leading representatives within their respective unions and are frequently involved in negotiations with their national aviation departments.

Iceland

The status of the Icelandic Assistants had improved immensely since our previous visit in 1983. Above all, they have achieved recognition, and the opportunity collectively to voice opinions and to discuss issues with the Department of Civil Aviation. During the course of 1987 their salaries had increased by 48.5 %; in a country whose rate of inflation was down to around 20 % compared to a three figure rate at the time of our previous visit! With salaries ranging between Dgl. 4.200,-- and Dgl. 5.400,-- per month, the assistants now consider their situation as "tolerable".

From June 1st, 1987, Icelandic controllers commenced working a new watch roster which reduced their weekly working hours from 42 to 36. Working afternoon, morning and night on the second day, followed by three days off, the assistants expect that their \pm 10 personnel will elect to follow suit. The preceding four years had seen a vast improvement in the working environment within the Reykjavik ACC and the new radar displays were most impressive. Computerization has yet to find its way to BIRD but a system is currently under development

and will involve a link to two new military radar heads to be sited on the north and east coasts of the country and possibly to a further station on the Faeroe Islands. Such links will provide a greatly enhanced radar coverage of the north-east Atlantic.



Sweden

Swedish Assistants' fears of losing a large proportion of their jobs to computerization are similar to our own. They anticipate that a number of Assistants can expect a complete change of function within the not too distant future. It is hoped that, to compensate, certain planning tasks could be transferred to the Assistants, much the same as we have done here at Maastricht.

Initial training of Assistants currently takes 19 weeks. The Swedish CAA had proposed reducing this period by a third or more but negotiation with the union representatives led to acceptance by both parties of a sixteen week course through the elimination of certain superfluous subjects. Assistants working at AFIS units are to be given additional training resulting in increased responsibility. Computerization of Swedish AIS is expected in April 1988. Further training will be given to AIS Assistants who will then become Briefing Officers. During this period of training, instruction will be given in meteorological matters which, by 1990, will allow the MET and AIS briefing functions to be combined.

During the summer of 1987 salary

negotiations with the CAA for all Swedish ATC personnel were successfully completed. An Assistant with thirteen years experience should now receive a salary of around Dgl. 60.000,-- per annum, an increase of approximately 17 %, inclusive of shift disturbance and some overtime.

Norway

In Norway, 1987 saw a reduction of working hours to a maximum of 37 1/2, dependent upon the kind of roster being worked.

It would appear that eight years ago attempts were made to do away with Assistants at the Oslo ACC. The Assistant staff at that time consisted of 11 persons. There are now 27! The Norwegian representative considered it a plus point that during the course of 1987 the Oslo Assistants were allocated additional tasks within administrative departments and the Briefing Office. Will there still be 27 operational Assistants next year we wonder?

During the year it was agreed with the appropriate authority that committees should be established to review various aspects of the Assistant functions in Norway, e.g. the future for the country's Assistants, initial and refresher training, revised functions for older personnel, and retirement age. A subject that regularly comes up during these meetings is additional payment for conducting on the job training. Assistants' representatives have continued to fight for this payment despite the fact that a Norwegian supreme court ruling against it is currently in force. The outcome is awaited with interest.

Norwegian Assistants can earn up to around Dgl. 75.000,-- per annum inclusive of overtime and shift allowances.

A new ACC for Oslo is currently in the planning stages and is expected to cost U.S. \$ 40 - 50 m.

Denmark

There is a total of 70 Assistants in Denmark, shared between Copenhagen ACC and TWR, and Aalborg TWR. With a requirement for at least a further 30, overtime and standby duties have become an unwanted norm. The urgent need for additional staff has been

further aggravated by the planned implementation of additional sectors when KATKAS, Copenhagen's new ACC, becomes operational on February 17, 1988. The Department of Civil Aviation had set up a committee to look into matters of training, seniority, salaries, pensions, etc... but, having convened eleven meetings up until October, it was considered unlikely that a firm conclusion would result prior to the deadline of December 31, 1987.

The year 1987 had seen the Danish Assistants receive a salary increase of more than Dgl. 300,-- per month and a reduction of working hours to 39 per week, planned to reduce further to 38 in 1988 and 37 in 1990. Agreement was also reached for up to 24 hours overtime being paid for standby duties, a necessary requirement in view of the staff shortage.

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EGATS E COMMITTEE H

— by Henk van Hoogdalem —

Items on the agenda of the TC:

1. No limitation on weather presentation

Due to limited capacity, the previous main computer (MC) was unable to provide weather information for the entire MADAP area. The area in the Northern part of the Hannover Sectors having been cut off from such a presentation on the displays. Since the implementation of the new MC, space is available and the TC will propose to Systems Implementation to cancel this limitation and have all received weather information (precipitation, cumulo-nimbus, etc...) presented in the MADAP area.

2. Tasks for Input Operators

The positive outcome of the experience with the actual tasks for the Input Operators gives the TC the courage to propose new tasks for the Flight Data personnel. It is the TC's opinion that standard outbound clearances in the Brussels Sectors can and should be given by the relevant Input Operator. Even in the Hannover Sectors, some new tasks can be performed by the Input Operators, to relieve the assistant controllers such as giving departure clearances for Berlin and passing estimates to adjacent centres after level assignment by the controller concerned. In the Amsterdam Sector, estimates to Amsterdam could also be passed by the Input Operator. A detailed proposal will be passed to Operations Management.

3. New Closed Circuit Television (CCTV)

Since we learned that a new CCTV system will become available, the TC

is collecting information on items necessary for display at controller working positions and planning how this information can best be presented. We are also investigating the possibility of having a display of METARS for selected civil airports beneath the MADAP area which would be updated automatically, in a similar way to the method used by our military (Lippe Radar) colleagues and which has been in use for several years.

TC Members : J. Doyle, J. van Eck, E. Vreede, R. Hölscher, H. Mertz, P. Hooper and H. van Hoogdalem.

MAASTRICHT R/T

SIA 23, B747, on route from EHAM to HECA, reports passing ARKON, and is cleared direct to GMH by the Ruhr sector controller.

As the a/c is approaching GMH, the pilot calls in on the frequency:

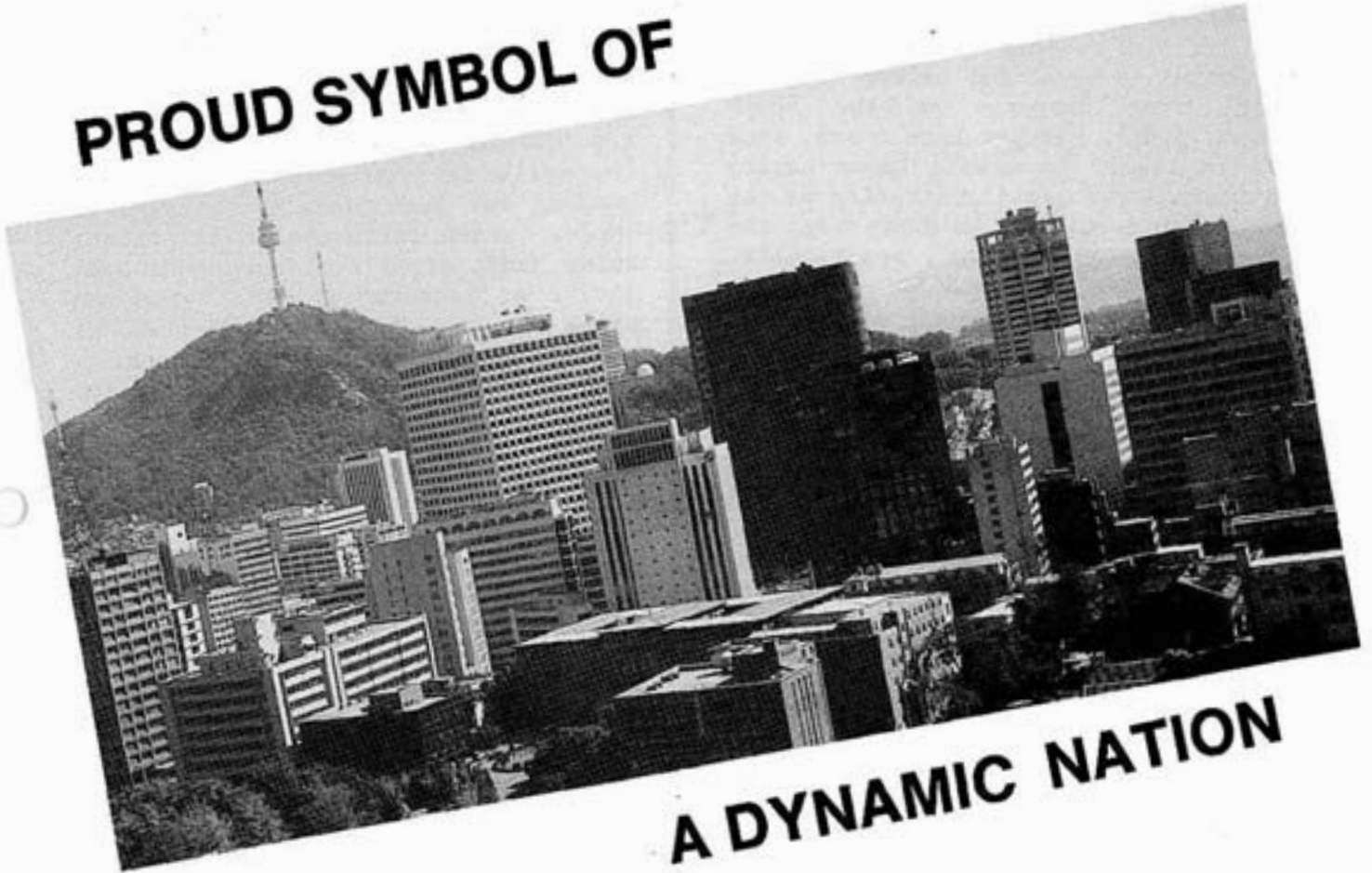
SIA 23: "Maastricht, SIA 23, after GMH, where do you want us to go?"

MAASTRICHT: "SIA 23, normally it's GMH to FFM, but you should know the route to Cairo...."

SIA 23: "Yes, we turn left at the first sphinx..."

— SEOUL —

PROUD SYMBOL OF



A DYNAMIC NATION

by Paul Demelinne

Arriving at Kimpo Airport, gateway to South Korea (regularly serving 16 international airlines and handling over 5 million passengers per year), the brandnew Olympic Expressway (6 lanes, 36 km. long) provides a smooth connection to Seoul T'Ukpyol-si ('Special City of Seoul'). The host city of the 24th Olympiad ranks among the top five most populous cities in the world, with more than 10 million inhabitants. The capital unfolds itself to the eyes of an alien visitor as a vast, but friendly metropolis. A spot were town-planners and architects succeeded in creating a harmonious mixture of styles and special arrangements. More than 20 bridges span the river Han, linking the ancient city with the new urban settlements along the south bank.

Seoul has been the capital of Korea since 1394, when Kong Taejo, the founding monarch of the Yi Dynasty, established the seat of his government in this sprawling, natural basin, surrounded by mountains in the south-east section of the country. The Korean language - a variant of the Chinese script - was introduced in 1446 by King Sejong. The 243 kilometers long Demarcation Line on the 38th Parallel of Latitude, which, running from the Yellow Sea in the west to the Sea of Japan in the east, cuts the peninsula in two, since the Panmunjom Truce of 1953, is situated only one hour's driving to the north. The first hostile confrontation between expansive communism and a western orientated society, turned Seoul into a burning heap of ruins. But the wounds

of war have not left behind a trauma. In little over three decades a proud symbol of the metamorphosis from a poor, agricultural community to a dynamic, industrialized nation, rose out of the ashes.

"If you possess a horse, send it to Cheju" (a beautiful island, covered with green pastures on the south coast, p.d.). "If you have a son, send him to Seoul" is a well known saying in South Korea. An illustration of the fact that Seoul is, in every way, the pivot on which the spectacular, economic boom of South Korea hinges. The gigantic concentration of financial- and trade - enterprises as well as the presence of over 80 institutes of higher education - among which there are 30 universities-, entice many young people to the capital, resulting in an annual population-increase of 3.2 %. On the Yoido island, trysting-place where the political and economic heart of the republic beats - the 69 story skyscraper of the Daehan insurance company dominates the scenery. Here, one also finds the stock exchange, the major TV- and broadcast companies and the offices of the National Assembly. The wide boulevards and streets are remarkably clean. Graffiti is obviously an unknown phenomenon over there. The drivers of the countless, small streetcabs wear white gloves, the passenger seats are covered with freshly ironed sheets, printed with trivial brand names, such as Mercedes and Volvo.

At the foot of the green Nam San (South Hill) down town Seoul, stands - as a monument of the past - the magnificent, ancient Nam Daenum (South Gateway), a centralized paradox of the hypermodern, mundane district of Myond-dong. Here, one finds the luxury department stores of tycoons like



Lotte and Midopa. The average tourist, however, feels more at ease in the worldfamous shopping paradise It'aewon, situated at the doorstep of the US 8th Army Headquarters. In numerous little shops, bazars and streetbooths, the Koreans offer a wide variety of those goods, in which they are unique: the perfect imitation of top quality products. Where-else in the world can you purchase a 'Gucci' handbag for less than 20 Guilders, a 'Rolex' watch (with the inscription: Swiss Made, sic!) costing around Dgl. 35.--? A 'Lacoste' poloshirt for the price to two packets of cigarettes, or Addidas gym shoes for as much as a pair of socks in Germany? The native inhabitants don't feel embarrassed at all about the brand name robbery as they look from their tiny pubs, (where every drink is accompanied by little appetizers called Anju), at the swarming mass of foreign bargain-hunters. At sunset, It'aewon transforms into an Entertainment Strip, with hundreds of bards and disco's. The facades of which seem to exist solely out of neon-light tubes. On the sidewalks, small tents are erected. In these mobile cafetaria's, amongst other delicacies, fresh red crab is served, at the cost of a hamburger overhere!

Inspite of the increasing western influence, the way of life of the greater part of the Korean population is still defined by the ideas of the Chinese philosopher Confucius. Elements such as patriarchy, the veneration of ancestors and exogame marriages are distinctive ingredients. "In this context, there is only a modest role for a woman," our guide Kang Seong Koon (23), a student at the Ewtha Women's University, explains, "Only at the age of 60, she is allowed to start a more liberate life". As opposed to rural residents, Seoul is a true melting-pot of spiritual bents, where Buddhists, followers of Taoism, Muslims and Christians live peacefully side by side. The location of Christian churches is distinctly underlined by hundreds of neon-crosses on rooftops, composing the capital's skyline.

The inhabitants of Seoul are very sports minded. In the week-ends, thousands spread over the surrounding



* The Seoul Sports Complex with the Olympic Stadium

hills, enjoying climbing and hiking. The municipality has arranged no less than 7 million square meters of land for recreational purposes. Large groups of like-minded, such as taxi-drivers, housewives, or complete families, make use of these facilities in an intensive way. They engage themselves in favourite games such as football, base-ball or tug-of-war. Joggers are hardly spotted. A typical phenomenon is the presence of dozens of green cages, the size of an apartment building, where up to 48 golf freaks can practice their drive shots at the same time! A still under estimated problem seems to be communication. In six months Seoul, hosts more than 250.000 tourists visiting the Olympic Games. The average inhabitant, however, hardly speaks (or just a little) English. Expect for the centre of town, indications and direction signs are only in Korean characters. The risk that an unsuspecting tourist walks into a brothel instead of, for instance, a cinema, is very well imaginable! Nevertheless, South Korea and Seoul are already in the spell of the greatest sports-event, ever organised. The 24th Olympiad with 23 official disciplines (tennis and table-tennis are the

newcomers), will merely take place in two major locations: The Seoul Sports Complex (including the Olympic Stadium, containing 100.000 seats) and the Olympic Park, both situated in the Chamsill district on the south bank. South Korea: 'land of the morning calm' as it is praised, has gone through a tremendous effort to build-up a good, universal reputation by means of hosting the Olympic Games of 1988. The price-tag attached? No less than 3.100.000.000,-- US Dollars. —

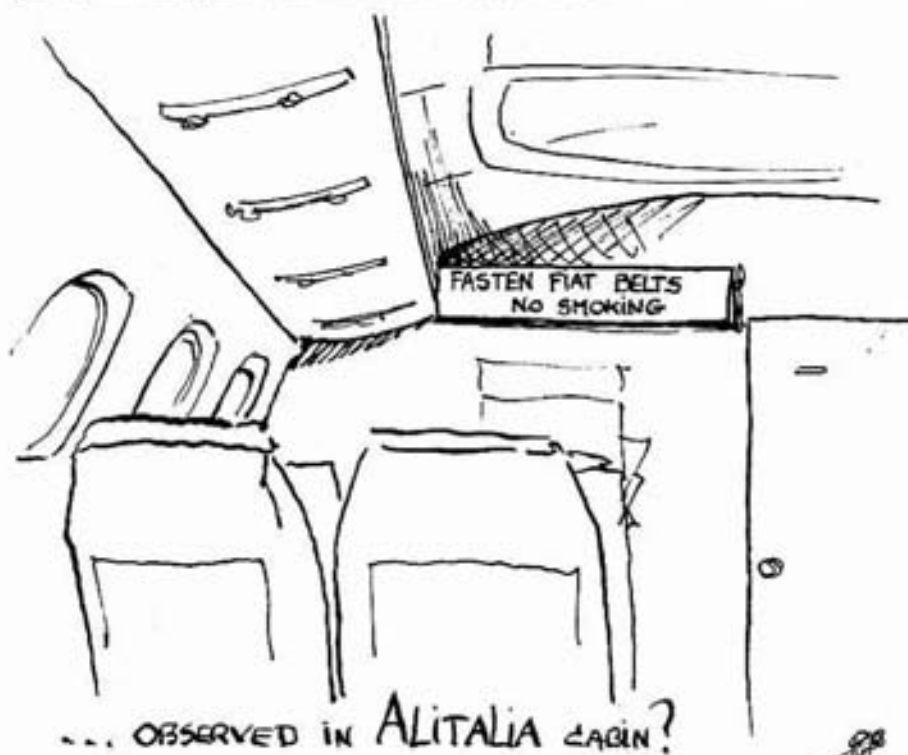
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CAPTAIN SCOTT IN ANTARCTICA

by Roy Evans

No, dear Readers, I am not referring to the ill-fated expedition led by Capt. Scott to the South Pole, but to the exploits of a present day Capt. Scott.

Nick Scott, also British, is the Captain that flew a Pilatus Britten-Norman Islander single-handed (except for the first 2 legs across the Atlantic) from Bembridge in Isle-of-Wight, UK, to Port Stanley in the Falkland Islands. Departing on October 14th, 1987, he eventually made it to Port Stanley on November 19th. You can see from the log. details that 3 weeks

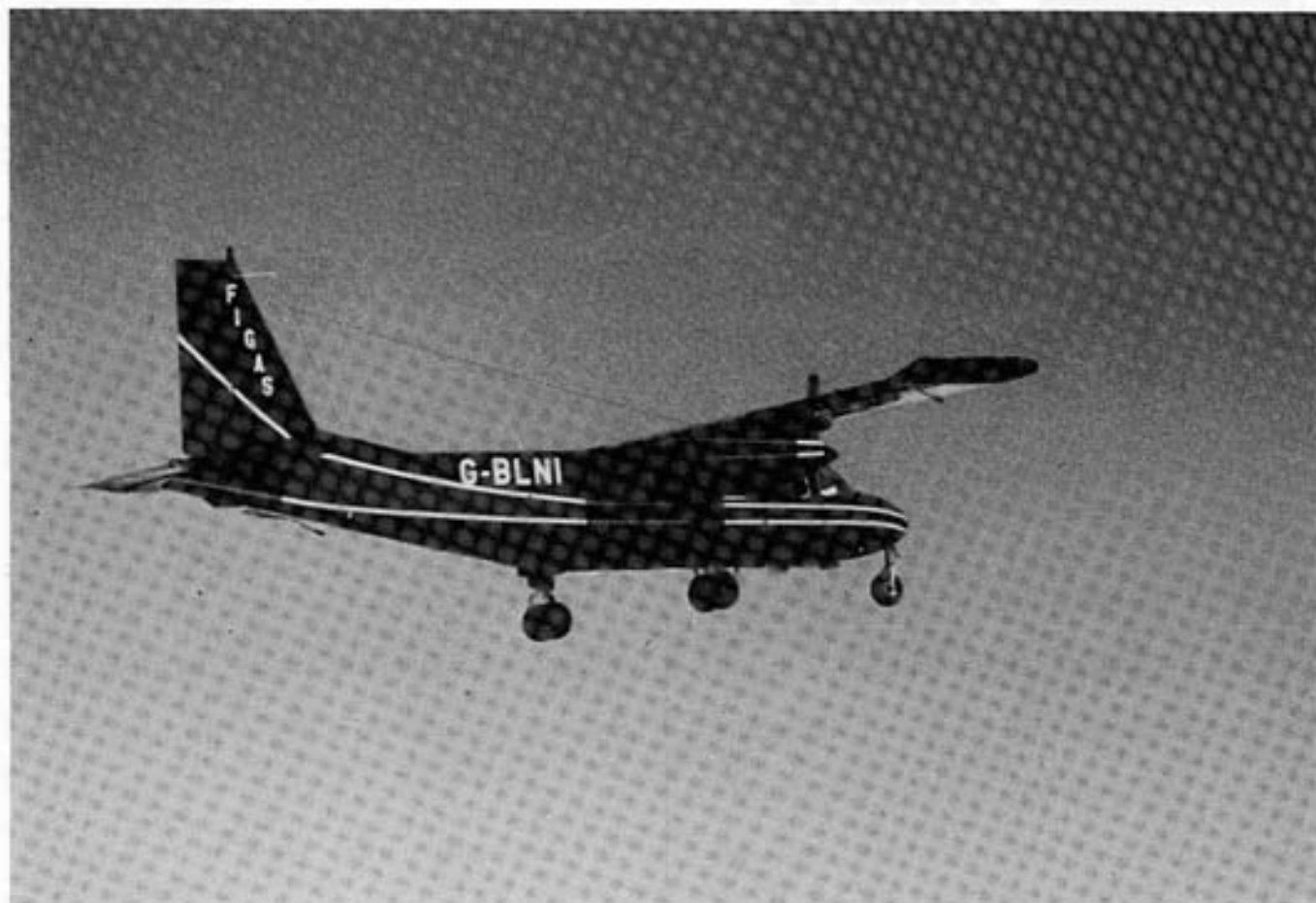
Captain Nick Scott



were spent waiting at Punta Arena to obtain permission from Argentina to fly to destination. In spite of a friendly relationship between Nick and the Argentinean consul in Chile (they often took afternoon-tea together), that permission was never forthcoming. Consequently on November 19th, Nick departed from Chile, flew a circuitous route to Port Stanley, and although diplomacy prevents me from saying exactly how this last leg was accomplished, you may rest assured that a lot of Anglo-Chilean Cooperation was needed, also a bit of "cloak-and-dagger" stuff. As Nick approached the Falklands exclusion zone, an R.A.F. F4 slid alongside, with another four of his mates sitting above as top-cover, and Nick told me that the conversation

went something like this:- F4 Jockey - "hellow, I've been waiting 3 weeks for you" Nick - "Sorry I'm late - got held up a bit". F4 Jockey - "Can I come alongside and take a photo?" Nick - "Sure, but let me put my tie on first". Further details of how the flight was accomplished. The Islander had no auto-pilot, so Nick had to fly it all the way by hand - He says that a "pee break" needed a bit of juggling. 200 extra gallons of fuel were carried in interconnected rubber tanks in the cabin: this gave an endurance of 13 hours. As this prevented smoking, and Nick is virtually a chain-smoker, this was an extra hardship. On October 26th he had to turn-back after 5 hours due to severe icing, turbulence and hail. Only one mechanical defect was experienced - the starboard landing light blew! After a champagne reception on the tarmac at Port Stanley, and several days of being feted as a local hero, Nick flew some island-hopping trips with the local pilots before returning to UK in an R.A.F. L101. Nick had only one complaint about his trip home: The R.A.F., like the U.S. Navy, run a "dry" ship! Nick is currently flying around Europe as marketing demonstration pilot for P.B.N. and has visited the Maastricht U.A.C. Knowing our





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FLIGHT LOG GBLNI

| | | |
|---------|------------------------------------|---------|
| OCT. 14 | - Bembridge-Reykjavik | - 08:30 |
| OCT. 15 | - Reykjavik-Goose Bay | - 10:30 |
| OCT. 16 | - Goose Bay-Bangor | - 05:10 |
| OCT. 16 | - Bangor-Essex County | - 03:00 |
| OCT. 17 | - Essex County-Wilmington | - 05:05 |
| OCT. 17 | - Wilmington-Fort Lauderdale Exec. | - 04:30 |
| OCT. 20 | - Fort Laud.Exec - Miami Int. | - 00:20 |
| OCT. 20 | - Miami Int.-Grand Cayman | - 04:30 |
| OCT. 21 | - Grand Cayman-Panama | - 05:20 |
| OCT. 22 | - Panama-Guayaquil | - 05:25 |
| OCT. 23 | - Guayaquil-Lima | - 06:10 |
| OCT. 24 | - Lima-Antofagasta | - 06:45 |
| OCT. 25 | - Antofagasta-Puerto Montt | - 08:35 |
| OCT. 26 | - Puerto Montt-Puerto Montt | - 09:25 |
| OCT. 27 | - Puerto Montt-Punta Arenas | - 06:20 |
| NOV. 19 | - Punta Arenas-Port Stanley | - 05:35 |

94:10



— NEWS FROM OUR NEIGHBOURS —

by Philippe Domogala

IFATCA RVP EUR. WEST

Situation in Belgium

It all started on Monday 14th December, 1987, when the controllers decided to start a spontaneous action: i.e. the strict application of the rules, for 2 hours periods.

What caused the action was mainly the non-application of an earlier agreement made by their administration to cancel the morning shift they had to work before a night shift (because of the heavy traffic at night nowadays in Brussels). Their employer now decided to deduct the hours not worked from the compensation they got after the night. Among the other important demands, the Belgian controller have an increase of salary to the European average, recruitment and training of new controllers to alleviate serious staff shortages, loss of licence insurance, etc..., etc...

The Minister responsible, Mr. H. de Croo, reacted in January by prosecuting 64 controllers for "illegal strike actions". Most controllers appeared in Court on 29th January, 1st February and 5th February, 1988. But before the controllers when in front of the Judge, the Minister used an old "law" from 1945 to order the "requisition" of the controllers on 28th January, 1988. Most controllers were waken up by the "Gendarmerie" during the night and "forced" back to work. Everybody was shocked and the IFATCA EUW Region sent a message of concern to the Minister. Later the Judge passed his verdict on the still pending case.

He declared himself "incompetent" to judge the case, however, he reminded the parties, of the right for employees to use strike actions and condemned the Belgian Administration to pay for the trial costs. At the time of writing the Belgian Control-

lers were still under mobilisation. In coordination with the Belgian Guild, a "letter to the Minister" action has been initiated, but limited to the Associations which are direct neighbours of Belgium.

All the neighbouring Associations reacted promptly (Netherlands, Germany, Luxembourg, France, UK and EGATS). All sent their concern to the Minister.

The Union supporting the controllers has initiated a court case in the Highest Belgian Court, in order to prove the Minister's action not in accordance with the Belgian Constitution.

Already a Judge has stated that Government employees had the right of using strike actions when in dispute with their employer and a University Professor on Law stated on Belgian Television that the decree the Minister used to mobilise the controllers was never meant to be used against civil servants on strike.

In the meantime, IFATCA Ex. Vice. President Prof. Wim ROOSEMAN has taken contact with The International Labour Office in Geneva and taken up the Belgian Controllers' case to them. They have good hope to find a favourable legal outcome to this worrying tend that Governments are using against controllers in Europe (The Greek controllers were the first ones to experience that "mobilisation").

We all hope that this disastrous situation will cease and that normal "employer-employees" relations will be re-established in Belgium, in the interest of all of us in the Aviation Community in Europe.



JOINT EUROPEAN CERTIFICATION FOR THE AIRBUS A320

The all-new advanced technology Airbus Industrie A320 powered by CFM International CFM56-5s won certification on 26th February, 1988, from the four European authorities - Britain's CAA, France's DGAC, West Germany's LBA and the Netherlands' RLD. This joint European certification is a "première" marking the start of a new era for a real European certification process. Certification of the single-aisle twin-engined 130-179 seat Airbus aircraft involved 70 experts on structure, flight characteristics and control, avionics, electrical, hydraulic and mechanical systems, environment and propulsion on the authorities' behalf, some of them since the A320's launch in March 1984.

It also included an intensive engineering evaluation and extensive documentation of data, as well as important testing activities that included four aircraft flying more than 1,200 hours in over 530 flights since the A320's maiden flight on 22nd February, 1987. Airworthiness authority pilots and representatives participated in or flew about a third of this flight test programme.

The intensive test campaign included a thorough evaluation of handling with the fly-by-wire controls as well as simulated lightning-strike tests and radio-magnetic interference (RMI) trials, demonstrating that the A320's digital fly-through-computer system, navigation aids and radios would continue to function in environmental extremes - including interfer-

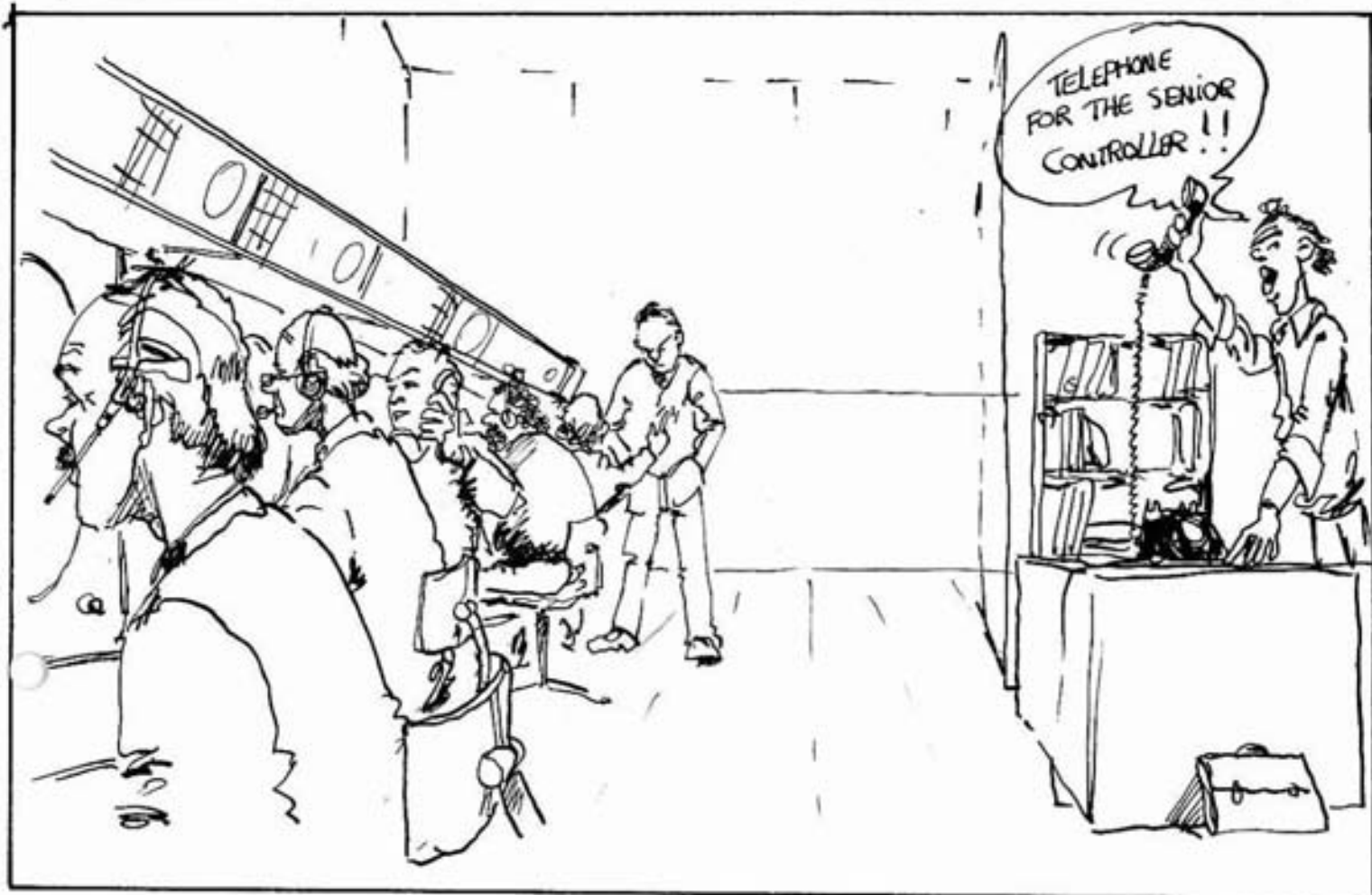
ence from high-intensity radio and radar. In fact, the fly-by-wire system is designed to meet much more stringent safety-level requirements than those for a conventionally controlled aircraft.

Environmental tests included take-offs through a water-filled trough to demonstrate that when there was standing water on the runway, water ingestion by the engines was avoided. Performance tests in hot weather and high-altitude conditions at Addis Ababa in Ethiopia and tests to ensure that handling qualities were unaffected under icing conditions were also conducted.

Over 50 hours of the flight tests were dedicated to evaluating pilot workload in the two-crew cockpit - including simulated worst-case incidents. These scenarios were acted out by airworthiness authority pilots, and even covered the unlikely possibility of one pilot being completely incapacitated.

As a further demonstration to airworthiness authorities, an extra 100 hours of route-proving were conducted by Aircraft Number Four, with Air France pilots and guest passengers on board. These flights simulated service conditions on European and north African routes - a total of 20 cities were visited - and the aircraft performed well with no technical problems or delays.

Evacuation tests were safely performed in October 1987, the maximum permissible load of 179 passengers clearing the aircraft in 81 seconds - 9 seconds less than required.



In addition to the flight test campaign, full-size airframe sections were used for intensive fatigue and static tests.

"We consider the successful certification of the A320 a milestone in airliner development - probably the most important since the certification of the first widebody jets", says Bernard Ziegler, Senior Vice President Engineering of Airbus Industrie, "and I know that, because of the severity of their special requirements, the certification Authorities share our view".

The A320 is also offered with International Aero Engines V2500s, and

flight testing of this version will begin in July this year. Certification of the V2500-powered A320 is planned for spring 1989.

First deliveries of the CFM-International powered A320 to Air France and British Airways are planned for late March. Other airlines that will take delivery of the A320 this year include French domestic carrier Air Inter and Ansett Airlines of Australia.

With 483 orders, options and commitments from 20 customers to date, the A320 is a world success as well as a European one.

ATR NEWS

ATR ON TOP IN THE 1987 COMMUTER MARKET

With 125 sales in 1987 and a contract for 12 aircraft signed in Canada on February 3, 1988, the ATR has confirmed its position as the leading new generation commuter aircraft. To date, 248 ATR aircraft have been ordered (firm and options) by 35 customers.

Partners Aerospaciale and Aeritalia have also launched the 70-passenger ATR 72, a stretched version of the ATR 42, to increase operating flexibility and enable airlines to cope with changes in traffic patterns. Scheduled to make its first flight this fall, the new ATR 72 will mark the birth of a true family of aircraft. As of the end of 1987, 50 ATR 72s had been ordered by 14 different airlines.

The ATR program was launched in October 1981 and the first ATR 42 was delivered on 2nd December 1985. By the end of 1987, 70 ATR 42 aircraft had been delivered to 23 companies around the world.

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