INPUT 1985 - III



EDITORIAL

As we approach the new year of 1986, we consider it a suitable moment to devote this issue to the future of air transportation. Both in the air and on the ground, there are many new developments evolving, and some of them will have a considerable impact whenever they are effectively applied.

- I will name just a few:
- Digital cockpits with F.M.S. and two crew;
- TCAS;
- Propfans;
- Use of composite materials;
- MLS;
- Data links;
 - Voice controlled aircraft;
 - Unducted fan;
 - etc...

Most of these matters and many others have been debated in Delft at the University of technology on 25th and 26th September, 1985. This event was of a very high standard and many speakers in the aviation world explained their views on the future of air transportation.

These works will serve as a basis for us to let you have some insight into the "advanced" aeronautics.

As you will have some free time during the Christmas and New-Year's period you will have the opportunity to study this valuable material instead of wasting time in front of an outdated T.V. screen!

On behalf of the entire Input Editorial Board, I wish you, however, and anyway, a Merry Christmas and a happy New-Year.

P. Béhier.



(WRITE IT DOWN)

NEXT COPY DEADLINE FEBRUARY 28 TH

PRESIDENT'S MESSAGE

1985 was an eventful year in aviation: it scored a high number of fatal accidents and yet in spite of this was very rewarding for the aviation industry.

The European ATC family lived through some dramatic moments in 1985: industrial actions, heavy restrictions, bomb alarms, hi-jacks and, last but not least, a significant increase in air traffic movements disturbed the peaceful efficiency of our professional life.

Speaking for EGATS in particular, one could say that 1985 was a mixture of success and disappointment; succesful events were: a few well conducted initiatives such as our R/T Forum and Stress-lecture, the excellent work of some of our Members and Committees.

Disappointing were : the loss of our good friend and colleague John Faesen, the lack of interest of some of our achievements and our failure to come to good terms with neighbouring associations.

May 1986 prompt us into renewed efforts to improve our weak points and optimize our succesful initiatives! There will be good opportunities to do so: the implementation of the Amsterdam Upper Sector in Maastricht in March undoubtedly will increase our operational and social activities, the agenda of our 1986 AGM will show a (long awaited) proposal to change the Constitution EGATS and a nev Eurocontrol Convention may offer us a new chance to strive for even better recognition and improved legal status.

I sincerely thank all those who contributed to EGATS activities large or small during this past year.

A Merry Christmas and a Happy New-Year.

Jan Gordts



by Jan Gordts

We in EGATS are well aware of the workload and problems involved when one decides to hold an international Conference!

But what if you want to run a 2 day symposium with approximately 600 participants, accomodate 15 lecturers and simultaneously run a large technical exhibition?

These were undoubtedly the problem the organisers of the Society of Aerospace Students "Leonardo Da Vinci" of the Delft University (NL) were confronted with when they started planning and organizing their 8th Lustrum which was to take place in Delft on September 25 and 26.

The result was clearly a success; having smoothly filled the large auditorium of the Delft University of Technology the symposium was opened in grand style by His Royal Highness Bernard who wished Prince the organisers good luck with their Controversial Theme: "THE NEXT GENERATION OF AIRCRAFT, EVOLUTION OR REVOLUTION?". Prince Bernhard, honorary president of the Society praised the high-tech developments which presently come to existence in the aeronautical field and compared these with other significant industrial changes in history.

After this high quality introduction the floor was taken by a succession of speakers whose papers were to be distributed later. Mr. Florax and myself attended all sessions and whereas Mr. Florax will describe some separate subjects which were dealt with on day 2 I will herewith attempt to summarize day 1 by picking out the most interesting topics of this remarkable symposium.

Mr. A.A. Hauser of General Electric was surely a well chosen speaker to open the series because his topic "The Unducted Fan Engine" was going to dominate many other discussions. The UDF engine can truly be seen as a revolutionary invention; it employs a counterrotating, highly loaded and unducted fan which is driven by a counterrotating turbine. The G.E. UDF has been designed so that the front turbofan blades are driven by a 5 stage turbine situated in the rotating part of the housing. The rear turbofan is powered by a counterrotating turbine of classic configuration.

The future of UDF is very promising: its fuel economy will be 25% less than the most modern high ratio turbofans. The UDF has recently performed its first static tests at max. RPM and it will be fitted to a B727 and later to an MD80 for inflight testing.

Almost in competition with Hauser, next speaker D.J. Pickerell the (Director Engineering Rolls Royce) highlighted the merits and the promises of the newest generation of advanced turbofans, actually in operation, and though these developments involve less spectacular (= less revolutionary) ideas than the UDF they will nevertheless have a direct impact on the near future and should therefore be considered as very important. Improvements in turbofan technology have apparently slowed down but are not finished: further efficiency improvements are possible with the application of continued technology and the removal of conventional design constraints.

Mr. Robert A. Taylor (Systems Manager of Collins Air Transport

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Division - Rockwell Int. Corp.) made a survey of the next generation products in avionics. How to make these costs effective? His first statement was certainly one of surprise: in spite of all the new available technology 95% of the currently flying transport aircraft still carry conventional equipment(!) whereas one would like to see a full glass cockpit fitted with keyboards, full flight management systems and full cat III autoland capability!

The absence of these characteristics clearly indicates economic constraints on behalf of the operator. Therefore insight into the new avionics developments is to be provided and the avionics manufacturer's role is to be defined in close consultation with the operators. There are areas, however, where the new revolutionary avionics are clearly winning the competition: microprocessors in 1985 only occupy 1/6th of the space and use only 1/10th of the power of similar devices in 1979. CRT continue to become the dominant display devices for the cockpit designs of the 1990's: they all use will rastered displays, they use optical band filters and will have increased high voltage capacity (to cope with the higher writing speeds). Flat panel displays may even gradually replace CRT's if they can be matched with the other cockpit devices; liquid crystal and thin film electroluminescent displays are the most viable candidates.

As far as systems are concerned the future task for avionics designers and manufacturers will certainly be one of integration: if they can utilize the same basic "core" of a system for various components then the final cost may be minimized thus reducing the system complexity and improving its reliability. During the afternoon two speakers initiated the audience into what is presently going on in the world mysterious of aerodynamics: Mr. Poisson Quinton (Senior adviser to ONERA France) gave us a glance at the various methods recently used to increase the lift of a given wing either using a "classical", mechanical flap or a part of the propulsive thrust of the aircraft. The present trend in mechanical high lift systems is more a "simplification" than a "sophistication" (however, with improved simple slat and flap designs) whereas in the powered lift systems very high lift increments have been obtained with the

so-called "jet-flap effect" using the turbofan exhaust flow directed OT deflected flaps. This method may, however, result in some detrimental interactions with the wing so that it becomes unsuitable for use on transport aircraft. For combat aircraft configurations, recent research shows a great future for vectored thrust systems for both low speed performance and high speed manoeuvrability improvements; in latter case the useable lift at high angles of attack can be improved by enhancing the Vortex lift by various special systems: strake, canard, spanwise blowing, etc...). Throughout his presentation Mr. Poisson-Quinton made extensive use of slides and diagrams.

Mr. Roger L. Winblade of NASA consequently made a brief summing-up of the various research programmes which NASA is presently conducting such as : high speed propellers, laminar flow control, digital flight control systems and advanced structure materials. The expectations are that there are some key technologies which promise a fourfold increase of efficiency in the next generation of transport aircraft:



<u>Composite primary structures</u> of large size such as wings, stabilizers and fuselage may provide as much as a 30% reduction in aircraft structural weight with lower direct operating costs.

Engine Technology : new technology in advanced turboprops and turbofans can reduce aircraft fuel consumption by 15 to 30% in comparison with the current generation of jet powered subsonic transport.

<u>Viscousdrag</u> reduction : skin friction drag accounts for approximately 30 to 50 % of cruise drag. Some potential improvements such as laminar flow control appear to make it possible to reduce this drag.

Flight Controls and Operating Systems : incorporation of highly integrated active controls will provide transport aircraft with stability augmentation, load alleviation, automatic energy management and four dimensional flight management. The driving considerations in this field are : efficienreduced flight crew workload, cy, flight handling qualities and, last but least, with not interfacing an automated air traffic management system.

To achieve this promise it is not enough to develop key technologies but also to validate them sufficiently so that manufacturers can be encouraged to use them. Mr. Winblade illustrated his lecture with a vast number of examples of current NASA projects ranging from simple wind tunnel tests to very complex in-flight test programmes. His conclusion was that evolutionary improvements in subsonic transport have been made but that a revolutionary step towards the Transcentury Aircraft Development depends highly on technology readiness and technology integration.

The next presentation was one of which the Delft symposium can be rightly proud: 2 Dutch engineers and exthe Delft students of Institute. L.B. Vogelsang and J.W. Gunnink have during the last years developed a new structural material (aramid aluminium laminate). The product, named Arrall, has been prepared and tested at the Delft University; it is a composite material consisting of thin layers of aluminium between which aramid fibres have been bonded.

Note : Aramid is a synthetic material produced by ENKA (Holland) and

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DUPONT (USA) also known as KEVLAR.

The result is a very strong material; lighter than most aluminium alloys but more resistant to tension, corrosion and metal fatigue.

The material is capable of blocking the continuation of minor cracks in wing surfaces because the aramid underlay would always resist fissures caused by the metal. Arall will soon undergo flight testing on board of a Fokker F27 and research has shown that an Arall wing would weigh about 30% less than a conventional wing.

The organizers of the Symposium had also found a most suitable and attractive eyecatcher for their event: in the main hall of the Delft University there was a splendid static exhibition displaying some of the finest examples of todays avionics and aeronautical technology.

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PUTTING NEW TECHNOLOGY TO WORK WITHIN AIRBUS INDUSTRIE

PUTTING NEW TECHNOLOGIES TO WORK within Airbus Industrie.

A difficulty with technology development is that they seldom match with market requirements as regards the timing of the introduction of new aircraft into airline service. An example of this is the 150 seat propfan airliner which is predicted to come even before 1992 for replacement of aircraft sixties. Airbus Industrie, of the however, started with studies on that back in 1980. The conclusion was to go ahead anyway with the A320 on the basis of advanced technologies. The A320 is highlighted by a number of innovations in technology, such as fly-by-wire, wing gust load alleviation, use of composite material, 2nd generation digital computers. Fadec. new generation of flight deck, automated maintenance system and the promising CFM56-5 and V2500 high by-pass engines. The A300-600 (replacing the A300 B4)

Compiled by Jo Florax

with more capacity has been further improved and the A310-300, the 4500 nm mile range version of the A310, made its first flight in July of this year.

Aerodynamics.

An interesting example of crossfertilization from one program to another is how principles derived from the advanced A310 wing section have been used to improve the A300 wing to a similar aerodynamic standard. As an example maximum lift in the landing configuration has been improved by 8%. There are a number of specific areas of innovation in which intensive work is going on. To mention three of them, of which the first is the adaptive wing in the form of variable camber to be introduced with projects to come. Compared to a wing without this feature an improvement in aerodynamic efficiency of around 2% is to be expected (see figure 2). The second is flow laminarisation to reduce profile drag (i.e.



S Variable camber control



suction or blowing techniques to achieve laminar flow). The third area of interest is the development of means to weaken and stabilize the shock on the wing upper surface, where the transition from supersonic to subsonic flow occurs (to be planned in 1990).

Structural aspects and materials.

The problems of producing material of consistent quality and with acceptable mechanical properties are only now being solved. Airbus Industrie is fairly confident that at an early stage they could have about 250 kg finished weight of Al-Li alloy in the secondary structure of the wing of the A320, the weight saving being about 25 kg. with Airbus Industrie's Together partners a four step program has been worked out aimed at progressive intro-Al-Li alloys a11 duction of to programs. A disadvantage of this development is the possible high price of these new materials, which in some will not be applications costeffective. The lightest possible structure is not necessarily the best one. The development of composites, however, will go on, moving now into a second generation of thermosetting composites (estimated price 3 to 31 times of todays'composites).

To give you an impression, the number of design parts for the A310-300 carbon fibre fin is 96, compared with 2072 for the metal fin, thus offering a weight saving of 140 kg (310 1b) or 22% (see figure 3).

Flight Controls.

There are some radical improvements in this technology introduced on the A320 such as:

- electrical signalling (fly-by-wire), thus making a big reduction in mechanical components and eliminating the need for auto pilot servos (which in turn simplifies the automatic flight system);
- introduction of a side-stick controller;
- use of fly-by-light to a limited extent.
- as a next step the introduction of so-called "power-by-wire" or the electric-hydraulic actuators. Not a new idea, it was used on the RAF's V-bombers to make them less battle damage. vulnerable to Electro-mechanical actuation systems be would probably heavier than hydraulic actuation but this approach will be a possible step to the airplane offering all-electric potential for much bigger savings (engine starting would be another all-electric for the problem aircraft).

Advanced Avionics.

A step forward in technology was the change over from the analog



avionics on the A300 to the digital technology of the A310. This made it possible to integrate some

of the computing functions and so reduce the number of different black boxes, an integration process that has been taken over by the A320 (figure 4).

CFDS There is the (Centralized Fault Display System), providing line maintenance customer personnel with a centralized checking facility for the aircraft's electronic equipment for with and systems electronic control. Two multifunction controller

A320 function integration



Decreased parts count - increased capability

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display units (MCDU) on the flight deck enable the maintenance mechanic to follow up defects reported by the flight crew. A message in clear and unambiguous language identifies the LRU to be replaced. No documentation is needed by the maintenance crew. Where tests are required after LRU replacement, you just use the MCDU (LRU's are fibre optic "bridges").

Airbus Industrie foresees little

chance of any revolutionary development in the next generation of civil aircraft; no miracles in propulsion nor in systems. Neither will there be any magic new materials. By that time evolutionary improvements in other fields, aside from new powerplant concepts, will have contributed to lower fuel burn. Airbus aims at high commonality family members, costeffective in acquisition and maintenance.





The airline business is in a state of rapid change. There is less regulation and there are more competitors. There has been a change in airline management as the market adapts to this new environment. Airline operating cost structures have also changed. Fuel costs have stopped escalating. In fact, the whole operating structure of airchanging lines is changing. With requirements, airlines need a family of product offerings. Airlines need costtechnology effective design which drives down all elements of their Direct Operating Costs (DOC) including fuel, maintenance and cost of ownership.

In particular this will apply to the new B7J7; Boeing aims at a 10% reduction in DOCs for the 7J7. The long-term market for this new airplane combines the replacement of ageing 727s and DC9s with future airline growth requirements. The 7J7 is to be operational in 1992.

Let us go through the Boeing family by consulting the following diagrams. Figure 1 shows us the number of seats and range in N.M. of the Boeing family of airplanes. Figure 2 gives us an idea of the total sales to airline operators.

Application of Technology Development.

Significant technology developments are leading the way to increasing the airline's revenue potential and decreasing the airline's direct operating cost (DOCs) by reducing fuel burn, maintenance and ownership costs.

1990's Technology on structures:

- aluminium-lithium alloys
- thermoset composites
- thermoplastic composites.

Benefits include lighter weight, higher corrosion resistance, improve fatigue properties and reduced manufacturing costs.

Compiled by Jo Florax

The Airline Business is Evolving

- The Airline's Requirements are Evolving
- Boeing's Plan is in Place
- and on propulsion:
- high bypass-ratio turbofans
- shrouded propfans
- advanced turboprops.

Boeing is working with the four engine companies who are actively developing contrarotating advanced turboprop propulsion systems. A 25% reduction in specific fuel consumption over the latest advanced turbofans available in the same time period is probable. Boeing and the engine manufacturers are finding solutions to the technical challenges associated with incorporating these new engine concepts with their advanced airframe concepts. Particular emphasis is being placed on installation integration, structural and mechanical reliability and noise characteristics.

The Boeing Family



digital Further developments in avionics are resulting in an integrated airplane flight control and systems concept. A majority of the wire bundles connectors and traditional primary and secondary flight control systems will be replaced with a few new high speed bi-directional digital data busses backed-up by fiber-optics, all leading to reduced weight, fuel burn and maintenance costs.



1992.

400 Engineers, designers and factory personnel are working specifically on the 7J7 development. Figure nr. 3 will give you a schematic sequence of that developing process.

In Boeing's mind, when you see the results, you will agree that the 7J7 is nothing short of revolutionary. And what did Bill Boeing say in 1928? "..... let no new improvement in

flying and flying equipment pass us.





YOUR VOICE WILL BE HEARD AT THE AGM '86 EUROMOTEL - TUESDAY THE 11TH OF MARCH AT 19.00 H.

INPUT

EGATS DELEGATION VISITS USSR

by Philippe Domogala

On special invitation from the Civil Aviation Workers Union of USSR (the association that represents the controllers there) EGATS representatives visited Moscow and Leningrad on 26-30 August, 1985. The delegation comprised Kees Scholts, Fred Le Noble and myself.

Upon arrival in Moscow, we were received by our hosts and placed in a "small" hotel owned by the Union (300 rooms in a 10 storey-building). The next day we were shown the new Moscow Air Traffic Control Centre in VNUKOVO Airport. The centre which cover the four Moscow airports and thirty other civil airfields, has twenty-nine sectors, upper and lower with a division flight level of 200. The system used is the Swedish DATASAAB type similar to that used at Semmerzake and in our MINFAP system controller inputs made via keyboard. They have 780 controllers in the centre divided in 5 shifts. There are always about 11% extra controllers on duty, in order to provide for traffic peaks and break periods. Their shift is

Day 1 : 14.00-21.00 hrs. Day 2 : 08.30-14.00 hrs. Day 3 : 21.30-08.30 hrs.

- Day 4 : off.
- Day 5 : off.

A medical check takes place four times per year and although retirement age is officially 60, the average age of the controllers is twenty-six. Out of the 780 controllers in Moscow, only four are above fifty. When a controller fails a medical or a proficiency check he is re-located in another job in Aeroflot.

The next day, we took a night train (the Red Arrow) to Leningrad, where we visited the ATC Development Centre. We were met by Professor P. Anishchenko, Chief Designer of the new Soviet ATC system. This system, called START-2, is designed to cover small ACC's and APP's all over the USSR until the year 2000 and could be compared with an improved MINFAP system but with small-capacity computers. It is expected to be operational in 1987. After a brief runningvisit through the HERMITAGE MUSEUM (it would take at least a week to observe everything displayed). Once more we took the night train back to Moscow.

We then went to visit the Research and Development Centre of ATC in Moscow which could be compared with the Eurocontrol Experimental Centre in Brétigny. This was an extremely interesting visit because we were shown something that is less developed in the West, a department devoted to Human Factors' and Ergonomics. The department, directed by Professor Dr. V. Karlow, has as its objective the determination of the limits (maximum load) of an individual, in this case the controller, using



EGATS Delegation in the red square, Moscow

psychological and physiological studies, together with associated technology. We were also shown some of the tests being conducted there. The psychology of the human character is taken into account by determining the personality and the personal history of the controller, using frequent psychological tests and interviews. All these data are put on electronic files, using small personal computers. The department also developed psychological tests in the form of video games, in order to detect the aptitudes and the abilities of children (aged 14-15) to become air traffic controllers. The games are aimed to reveal the possibilities of a child to orientate him towards a profession in which he could better serve the state.



Moscow, Vnukovo, ATC Centre

The psychological testing is not only done for recruitment but also constantly during the career of the controller. Physiological reactions such as retina movements, respiratory rate, blood pressure, heart beat and skin galvanisation (electric potential tension of the skin) are monitored during the tests.



At Leningrad - Professor P. Anischenko and two military colleagues Prof. Karlow: "By determining the personal maximum capacity of a controller, we can assign him to a busy or not. so busy centre, to radar or non-radar duties; to tower duties, etc... By doing so, we preserve his health and therefore have him serve for a longer period of time within a year (less sick days) and we preserve his life, which means he can work until an older age in his career. We generally also improve his efficiency by 10 to 20%, depending on individuals, by removing part of the stress factor..."

After this visit, we had an informal discussion with the personnel of the centre for over an hour. Some of them, including the Director of the centre Professor Anodina (a lady), expressed some concern about the lack of contact with Eurocontrol Brétigny, although they had regular contact with other western research centres, including the FAA. Between these visits. we also were shown the touristic sites of Moscow , such as the Kremlin, Red Square, the Space Museum, etc... a very beautiful city indeed.

After such a visit to the Soviet Union, the first time for all of us, the impression you have is that, despite the very different system, the Soviet Union needs to be known better.



Tests for Controllers at the research centre, Moscow

From the ATC point of view, their level of technology appears behind our level of system development in Maastricht or that in some other western countries. In their research into human factors, however, perhaps we have much to learn from them.

Our sincere thanks to Victor Finagin and Vladimir Zuev who organised these visits for us, in a very efficient and friendly manner.

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IFATCA - EUROPEAN REGIONAL MEETING STOCKHOLM - 12 - 13 OCTOBER 1985

by Philippe Domogala

This year, the Meeting was held in chilly Sweden. EGATS being represented by Ger Horsman, Andries Bonne and my-Fifteen Member Associations self. attended and in a very relaxed atmosphere, exposed their wishes and problems. These problems range from new ATC Systems being ordered by Administration which appear not to work satisfactorily (Austria and, Yugoslavia); to a severe increase in traffic (Norway and Sweden); to a controller being sentenced to two and a half years in jail in a court case following a DC9 crash (Italy) and to the side-effects of the U.S.A. deregulation policy, where trainee controllers are now offered about half the salary of the controllers in existing employment (U.K.). Because of the high cost of route charges to pilots of small aircraft in the U.K. these aircraft tend to be flown under V.F.R. even (it was alleged) in I.M.C., in order to avoid payment of route charges which results in serious ATC problems.

A Loss of Licence Insurance was presented to us by ANSA and WINTERTHUR but it was not of direct interest to us, since the time-limit of cover is fifty-five, being the average age of retirement of controllers worldwide. The Meeting decided to help our Yugoslavian colleagues remain in IFATCA. Yugoslavia has an annual inflation rate of over 100%, low salaries are not indexed and currency exportation restrictions. Therefore, all the European Associations will contribute 1 SFR per declared IFATCA Member, in order to pay for the 1985 Yugoslavian subscriptions.

Adrian Enright expressed the wish to step down as Regional Vice President for Western Europe and there is now a good chance that, during the next IFATCA Conference your servitor will be elected R.V.P. After over 10 years of EGATS participation in IFATCA, this will be the first official function in IFATCA to be held by EGATS. Our thanks go to the Swedish Association for an extremely well organized meeting and to Air Skandinavian Service for the transport facilities. The next European Meeting will be held in PADUA, Italy in October 1986.



The cockpit and RAF arew of the BAC 1-11

A flight in the voice-controlled experimental aircraft of the Royal Aircraft Establishment

- Bedford -

During the month of October, a number of persons from the Maastricht U.A.C. including some of our military colleagues, were given an opportunity to fly in the experimental BAC 1-11 from the R.A.E. Bedford. The flight lasted approximately 1½ hours and proceeded from Maastricht towards Hamburg and back.

Deputy Head of Operations Division, Mr. Walter Endlich, had arranged for me to participate in this flight, together with our Head of Division, Mr. Jan Beishuizen and several other operations personnel.

We were welcomed on board by the pilots and specialist engineers who explained various features of the aircraft, in particular the voice control

experiments. An on-board speech recognition computer can "understand" and execute about 200 voice commands given by the pilots who are serving Royal Air Force officers. They gave us a convincing demonstration of just how this unique feature works in the air, and it really does work! It is quite amazing to observe the captain giving a verbal instruction to "turn left 10 degrees" and then to experience the aircraft actually performing the manoeuvre. A command to "reduce speed to 230" is given, the thrust levers come back on their own and the aircraft flies at 230 indicated! It is also possible to instruct the system to set course direct to a specific nav-aid or way point (provided of course that it is listed in the memory) or to pick-up a given heading. It was reported by a Welsch engineer that the machine also has a capability of understanding the Scottish accent!

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We now have a brief description of the aims of the Royal Aircraft Establishment Bedford compiled from their Brochure by Norman Brown.



The RAE BAC 1-11 in front of Beek tower

THE ROYAL AIRCRAFT ESTABLISHMENT (RAE). Situated at Bedford, the RAE handles the civil avionics research in the U.K. using two specially equipped research aircraft, a BAC 1-11 and an HS 748, to investigate and develop techniques for the integration of avionics equipment into flight decks planned for the future.



The participants before take off

The objective of this research can be summed up as:-

- maximum payload at minimum cost
- more efficient air traffic management
- accurate and predictable navigation. Major research programmes already completed include:-
- evaluation of electronic flight-deck displays
- measurement of radio navigation aids (VOR and DME) system characteristics
- 2D area navigation performance measurement
- 3D area navigation evaluation (with climb/descent control)
- improved autopilot pitch control laws, including direct lift control (DLC)



Part of the electronic equipment

- manual DLC optimisation and assessment ;
- handling with relaxed longitudinal stability
- economic Cat III programme
- precision approach path indicator (PAPI) development
- development if monocular head-up display (MONOHUD)
- evaluation of a ground proximity warning system (GPWS)
- two-segment and steep-approach techniques.

Current research programmes:-

- 4D area navigation (with time-slot following)
- navigation and electronic displays integration
- non-linear flight control techniques
- data-link with air traffic control
- trials with advanced air traffic control
- civil data-bus
- direct voice input (see separate article).



Navigation test display



MEDICAL MATTERS

by Norman Brown

In view of the fact that no honest, self-respecting medical practitioner (Doctor to you) would ever risk his reputation by subscribing to our humble rag, I - Scoop the Triff - have offered the benefit of my extensive knowledge, acquired through many years experience of how not to live beyond the age of fifty, in the best interests of our readers.

The topic for this issue is that old bug-bear of Air Traffic Control stress, known in some medical circles which should know better as "Stressus", that's Latin.

Stress can be attributed to many factors, principal among these being Supervisors, adjacent units, banks, Skol, wives or indeed (perish the thought) husbands.

One does not intend to attempt to cover such a wide selection of causes at once, so will merely cover the most popular. Forgive me if I miss your particular favourite. Broadly speaking, the causes of stress can be designated as the psychological and the physical. The psychological causes can further be described as pertaining to anything not explained by physical factors. This simplifies life immensely does it not, and indeed immediately relieves one of half the causes of stress. Don't you better?' Nothing to it, this feel doctoring.

Now we come to what is by far the most common form of stress, the physical. An example of physical stress would be getting up for a morning shift, proceeding to the bathroom ("staggering" is a better description, but doesn't scan so well) and squirting shaving foam into one's armpits and deodorant onto one's chin. Of course I concern myself here with the gentlemen, what the ladies would squirt - and indeed where they would squirt it - I cannot pretend to know. Undoubtedly they will take my point, and substitute accordingly.

Where was 1?

The obvious answer to this form of stress is simple:

- Do not on any account get out of bed.
- Do not work morning shifts.
- Use an electric shaver, and don't worry about your odour.

Another form of physical stress is more common, complex and difficult to diagnose; I refer to Supervisor induced travail, known medically as "Attilla's Syndrome".

- a. Raised eyeballs.
- b. Signs of disbelief.
- c. Cries of "static picture"!
- d. Indecipherable position rosters.
- e. Entire teams on duty at midnight.

Sadly for mankind, there is no known cure for this form of stress. So as we medical men say "Fortunata tuffus ad infinitum".

Stress engendered by adjacentsubjacent or indeed nascent/subnascent centres is by far the easiest to handle. My Grandfather always told me to face a problem with good humour and simplicity, so the obvious answer is smile and hang-up.

My Grandfather smiled and hung-up all over India (which at that time was ours) and Tibet (which wasn't), but I understand his smile faltered when he reached France, at a time when IT very nearly wasn't, either.

My other Grandfather must have had the same simple approach to life, though I never met him. He beetled off to Canada, presumably to escape a particular form of stress - family. He hasn't been seen since, which perhaps is for the best. He also, incidentally, spent a short time in the France-whichalmost-wasn't, before enjoying an enforced rest in a Teutonic health and efficiency camp. No offence meant, your honours.

Digression is another manifestation of stress, so I'll save the rest for some other time.

The Medical Adviser answers your Queries.

Dear Doc,

I recently woke up and found that my entire team had gone home. On proceeding home myself, I found that my wife had left me for a half-wit dwarf of Armenian extraction, that my dog had AIDS, and the cat had run off with the owl in my boat.





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FOKKER ON THE WING

by Jan Gordts and Jo Florax



With over 60 years of aircraft manufacturing experience Fokker has established itself as a respected leader in the industry. Since 1919 Fokker has developed a great number of the world's most famous aircraft, including many which made important contributions to the growth of major airline networks. But it is in the development of short-haul airliners Fokker 100 cockpit

that Fokker has emerged as the recognized expert. Nearly 1000 F27s and F28s have been sold to over 170 operators. The F27 is the most successful turboprop airliner flying today, enduring climatic conditions ranging from desert heat to arctic cold. Its airframe incorporates though, lightweight composites and has proven itself so rugged and reliable that it now has a

90,000 cycle service life. The airline industry is faced with a rapidly changing environment, marked by several important characteristics of relatively recent development. Passengers expect high standards of service and their requirements are increasingly demanding. To meet these needs airlines are having to change the character of air travel in a number of ways. are being developed Networks and extended by more direct flights more destinations and higher frequencies. The liberalizing effect of deregulation, together with fluctuating fuel prices, has had a dramatic impact structures on cost and growth opportunities for short-medium range operators. A development underlining the need for economy is the vital importance of aircraft-mile costs and a growing efficiency.

The Fokker view-point.

- The decision to launch a new aircraft must be based upon commercial grounds; implying a reasonable chance of breaking even and, better still, making money.
- 2. On the technological front its role is to find ways and means to lower Direct Operating Costs (DOCs), improve passenger appeal and to guarantee safety. What do we have availabe at this moment?

New materials, new engine technologies, reduced maintenance costs, lower weights and the application of computer technology in the design and engineer phase. New technology is foreseen as being first applied in the 150seaters.

- There are 3 options:
- a complete new aircraft;
- b. a derivative aircraft and
- c. the option to stick to 1985 technology.

In the opinion of Fokker it will become extremely risky to launch new aircraft programs, assuming that profit making is the criteria. This complex situation has been carefully investigated and the various influences identified in a Fokker market study began in early 1982. The study was based on Fokker's perception of a requirement, continuing at least until the turn of the century, for some 850 new airliners in the 100-seater category. Fokker met with airlines all over the world to determine what type of aircraft it could build to operate in the shorthaul market (a market to be defined as the 50-120 seat bracket). An early revolu-



The Fokker 50

tion, resulting in a completely new aircraft in the market, is very unlikely. In other words Fokker had to go for something based upon maximum commonality with the F27 and F28.

The F100.

The F100 was not intended to replace the F28. It was, and is, intended to replace a substantial part of the 2000 DC9s and B737s in operation today.

Technical.

a. Aerodynamics

The advanced transonic wing design applied to the F100 benefits from supercritical Fokker's wing research. This highly efficient low together with weight wing the Rolls-Royce Tay engines, guarantees high cruise speed, low fuel burn, high lift and good field performance.

b. Flight deck

The F100 advanced two-man crew flight compartment features the digital data processing technology of the Arinc 700 avionic equipment



The Fokker 100 in Swissair livery together of Australia colours with the F50 in Ansett

Altitude : FL270. and full colour Cathode Ray Tubes. Engines : Pratt & Witney PW 124 with Flexible switching enables data of the Primary Flight Display (PFD) 6-bladed Dowty Rotol propeland the navigational display to be ler of 12 feet diameter. shown on either upper or lower The structure consists of: display units. Weather radar data metal primary structure; - advanced composite secondary strucmay be superimposed on the NDF. A ture comprising glass aramid and high level of automated flight, graphite fibre; from take-off to landing with Cat. comprehensive corrosion prevention, 3 capability, is provided to ensure thus reducing maintenance costs. all-weather operation. Structure C .. Many parts of the F100 structure consist of adhesive-bonded components. This brings advantages such as relativily low airframe weight per seat, good fatigue qualities, corrosion protection, good durability. For lower operational costs weight saving and lower fuel consumption many composite materials are used in the F100, such as carbon fibre, aramid fibre and glass fibre. Other data: Capacity : 107. Range : standard with 107 pass : 1155 nm. optional with 107 pass : 1475 nm. Performance: Max. cruise speed : mach 0,75. Max. cruise altitude : FL 350. The F50 The F50 is a 50 passenger high wing twin engine propjet for short to medium haul. movi Range : Standard 690nm with 50 passengers. Ine Optional 1570nm with 50 passengers. Speeds at typical climb 200 kt IAS. at typical cruise 287 kts. TRANSPACK is specialized in international moving Your belongings are carefully packed and transported from door to door, at reasonable charges. We have our own agents all over the world. Call for free information. TRANSPAC International moving Haarlem 023-319284 The Hague 070-945929 Rotterdam 010-145550 Amsterdam 020-433055 Utrecht 030-433801 Emrikweg 14, Postbox 540, 2003 RM HAARLEM

Fokker 50 cockpit

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FOOTBALL TOURNAMENT AT MAASTRICHT 1985 ECC by Paul Demelinne

Considering the permanent confrontation with the ultimate limits of conditional buoyancy a HOMO SAPIEN specimen can be exposed to, participation in the ECC (European Controllers' Cup) football tournament may be classified as top of the bill among the great sports-events. Compared to a happening like this, a triathlon is more than scratching around in a sandbox...

The 18th edition (10th-13th September, 1985) of the annual battle which took place in the arenas of Maastricht (daytime) and Valkenburg (evening/night) revealed once more that an European ATC controller playing football is basically composed of the combined physical qualities of Rambo I and II, Mr. T and Richard Burton (the latter advised by AA Int.).

A report

In the beginning of March it became obvious that for various reasons Roma would have to give up the ECC 85 organisation. Ab van Ommen and Jan van Eck of Eurocontrol SCOPS (Sports Club OPerationS) realised that skipping the event for one year could be detrimental to the future of this tournament and considered the possibility of taking The the organisation. 1977 over scenario, when Eurocontrol Maastricht hosted the 10th championship, was revived, followed by a number of orientating meetings. Although preparation time was extremely short (little over four months), SCOPS took up the challenge. Jan van Eck: "Collaboration was assured by SCOPS members, Eurocontroland GAF colleagues, management and a number of sponsors. Their spontaneous, extensive cooperation made us confident that we would be able to cope with the tremendous workload which was facing us".

The Sportpark West at Maastricht

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with seven playing grounds WAS reserved, as well as hotel accomodation in Valkenburg, where the Cocarde-centre was chosen as organisation headquarters and general pied-à-terre during the tournament. A group of coordinators was nominated, with representatives from the various U.A.C. Maastricht sections. involving themselves in affairs such as: catering, transport, finance, competition-leading, accomodation, "internal services", public relations, etc..., with both Ab van Ommen and Jan van Eck in an overall supervisory capacity. Progress meetings were frequently loaded with hot discussions. The time pressure was felt continuously. Nevertheless, last minute problems such as, for instance, the cancellation of a major reservation by the Schaepkens van St. Fyt hotel (without specifying valid reasons), or the replacement of fellowworkers who withdrew from the organisation, were succesfully tackled and resolved. By the way, it quickly became very clear that the ECC 85 would set a new overall record with participation of 39 20 teams from different countries, totalling nearly 700 guests!!!

D-day was set for Monday September 9th. Venue was at Cocarde, where the Burgomaster of Valkenburg and his



Fanatic struggle for the ball

aldermen offered a welcome-reception. Unfortunately his opening speech did not get the undivided attention of all present, due to the protracted process of greeting and meeting old friends. Nor did Enzo Scozzari who offered on behalf of the Padova delegation the 'Antonio Russo Memorial Trophy' to the organisation committee in remembrance of the Padova team captain 'Tonio' Russo who died whilst playing football last May. This trophy would become the Fair Play prize for this year's event.

The tournament, comprising 164 matches (!), was blessed with perfect conditions and weather progressed smoothly. Sportsmanship prevealed in general between the chalklines. The number of yellow and red cards was fairly low and the only minor incident was an official reprimand by the ECC executive committee to the Las Palmas team, in an attempt to reduce a little their overwhelming enthusiasm. But the struggle for goals, and consequently points was, of a fierce and ambitious nature. Take for instance ROLAND REIFF of the Stuttgart squad. His achillestendon tore off completely after only 10 minutes playing time in the opening match between Stuttgart and Manchester, whilst the closest opponent stood at approximately 8 metres distance. The ball was even further away!

Roland confirmed more or less the opening lines of this report by driving home personally with only a temporary bandage round his heel. The next morning he called the organisers by telephone reporting his safe return home and wishing everybody lots of fun and success, finishing with: 'Sorry, I guess I have to hang up now. A beautiful nurse is pulling my arm and repeating constantly that the surgeon expects me on his operating table within ten minutes'... Unfortunately, as the tournament went on with long days and extremely short nights, a few more contestants inspected the inside of the first aid facilities at the Maastricht delivered there hospital; with 12 variety of injuries.

In the midst of this sportsmanlike battle, the Maastricht team started resolutely its victorious crusade. Whether it was due to the brandnew shirts sponsored by a friendly airline company, homebased at Düsseldorf, or the unbelievable performance of Harrie de la Haye who, on his 40th birthday, was called upon to replace the injured first choice André 'Urbanus' Abts between the goalposts, will always remain an unanswered question. The second place in the preliminary round (after group winner Manchester) had already qualified the homegang for the main competition, which meant in fact a position among the first sixteen. A ranking that had never been achieved in previous attempts. But the team reached to ever greater and unexpected heights as the tournament went on. The scientifically developed tactics were not always understood by the supporters.

Final results ECC 1985 at Maastricht: COPENHAGEN 2. MALMÖ 3. MAASTRICHT NORWAY FRANKFURT MANCHESTER 7. LAS PALMAS 8. PARIS 9. LONDON 10. MUNCHEN 11. PRAHA 12. BRUSSELS PADOVA 14. STAVANGER 15. HOLLAND 16. PRESTWICK 17. MADRID (winner plate competition) 18. ROMA I 19. BRINDISI 20. SANTA MARIA 21. KARLSRUHE 22. BEOGARD 23. BREMEN 24. ZAGREB 25. BREST 26. VIENNA 27. REIMS 28. DUSSELDORF 29. ROMA II 30. SCHIPHOL 31. STUTTGART 32. BARCELONA 33. BELFAST 34. STOCKHOLM (winner FAIR PLAY trophy) 35. BUDAPEST 36. DUBLIN 38. ICELAND 39. LISBOA

MEMORABLE MAASTRICHT ECC MOMENTS.

The chef at the Bellevue hotel in Valkenburg gave way one night to an (amateur) colleague from Padova, who created a super "Mama mia" spaghettidish.

Karlsruhe created new standards. When the barkeeper in their hotel acclaimed 'last orders, gentlemen', they responded: '108 beers please'!!

Klaus Dylus, chief 'internal services', muttered during his tour around 14 dressingrooms with his arms packed with rolls of toiletpaper: "Ist dass vielleicht 'n Scheissjob"...

Gigi and Claudio of the Roma team hired a car to visit an acquaintance in Duisburg (Germany). Upon arrival in the city they asked a policeman where they could find the wanted address. The required information was given in a friendly, helpful way - accompanied by a speeding ticket!! At a total loss and with the alcohol still steaming out of his ears, a Bremen player looked on the third tournament day early in the morning into a rubbish-container trying to locate a missing plastic bag containing personal belongings. One of his team mates (also not in perfect shape) passed by and asked: "Nah, hastte hunger?"...

A chartered boach showed the ladies present the beautiful scenery of South Limburg. A tour which will last in their memory for quite some time because they were accompanied by the bardic songs of troubadour Henk van Hoogdalem and his banjo...

Norman Allen, Prestwick ACC supervisor and rightwinger in the pilotscontrollers team, managed to kick one ball in the direction of the ladies goal. After this amazing effort he kept on running, passed the goal line and used the advertisement-board right next to the goal defended by Jeannette Urlings as an open air lavatory...

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However, captain Manfred Grebien and his merry men never faltered. The second round was captured in a Hitchcock-like way, with only a slightly better goal difference (4-2 against 3-2) than the 84 ECC cup winner Las Palmas. THE MAASTRICHT MATADORS had reached the semi-finals! There, the brave squad met their Waterloo against Malmö: 0-1. But the spirit was unbroken, because one day later an immaculate third place was assured by beating Norway: 1-0. The final contest between the Vikings of Copenhagen and Malmö produced some excellent and exciting scenes. Ultimately Copenhagen proved to be the best team: 2-0. The final match was preceded by a confrontation between a ladies team and a pilotscombination of veteran controllers. The 'gentlemen' didn't have much confidence in a positive outcome of this affair and stationed two goalkeepers as well as three libero's on the grass. Too bad that this highlight came after 10 minutes to a premature end when a sizeable CUMULO NIMBUS made a low pass over the pitch... Although it was Friday 13th, the ECC 85 came to a happy end. As an apotheose of a fantastic four day festival, where friendship and relations were reinforced, everybody danced and enjoyed themselves during the farewell party in the Cocardecomplex. There was much appreciation for the tournament videofilm, made with great feeling for humour and detail by Martin Germans and displayed on a closed multi-TV circuit. As the last tune of the dance-band faded away, the first busses, destination Schiphol, blew their horns. One sentence kept repeating itself during this moment: "thanks again and goodbye. See you again next year in Praha for the ECC'86".



Enjoying the sunshine and a beer between matches

Photos by Michel Nicolay

BRANIFF 61 CLEARED FOR TAKE OFF

from the magazine "Braniff Destination"

John J. Nance is a free-lance writer based in Tacoma, and a former Braniff pilot. He is author of Splash of Colors, published last year by Morrow.

Thirteen Boeing and Douglas jetliners belonging to different airlines and filled with travelers and busy pilots were backed up waiting for takeoff. The mix of aircraft included jumbo jets such as the DC-10 and 747, as well as the much smaller DC-9s and 737s. The tower controllers had been trying to clear them for take-off between arriving flights as fast as possible, but as always in such a line-up, the smaller jets had to wait a few minutes after each jumbo took-off for the jumbo's wake turbulence (the dangerous, swirling wind currents stirred up by a

by John Nance

heavy airplane lifting off) to dissipate. Aircrews are used to hearing the incantation from the tower: "Caution, wake turbulence departing heavy (jumbo) jet". And all aircrews at busy major airports are used to having to wait in line at peak periods for take-off.

The reasons for this particular line-up, however, were rather strange, as the crew of the first jet in line, a medium-sized Boeing 727, discovered when they keyed their radio to talk to the tower.

"Uh, Regional Tower, sixty-one. There, uh, seems to be a terrapin on the runway, sir. When you get ready to clear us for take-off, I'm not sure we can get past him safely".

The tower controller was puzzled. He grabbed his binoculars and stared at the runway. There was no airplane out there in front of the Boeing. Besides, he didn't recognize that name.

"Sixty-one, where is he?"

"Tower, he's now moving slowly across the numbers for 17 Right on a heading of, I'd say, two-zero-zero degrees, I'd estimate the terrapin's ground speed at about a tenth of a knot".

The air traffic control specialist working ground-control frequency joined the tower controller in looking through a set of binocular. He, too, was puzzled. There didn't appear to be anything on the end of 17 Right.

"Sixty-one, what sort of aircraft is the 'terrapin'? We're not familiar with that type".

The crews of the other jetliners waiting their turn began craning their necks to see what sort of private aircraft was holding up the procession.

"Uh, tower, it's not an aircraft it's a type of turtle native to the Southwest. Look, can you send out a car or something? We don't want to kill the little fellow, and he isn't exactly moving fast". The tower controller had had to deal with a staggering assortment of problems in his career - including an occasional moose on the runway when he worked in an Air Force Base tower in Anchorage. Never, however, had he been forced to deal with a single, solitary turtle holding up a half-billion dollars of aerial hardware.

"Can you get around him, sixty-one?" "We could try, but someone behind will probably mash him. We'd rather have him off the runway. Anyway, he's headed off to the side right now. Should be clear in a minute".

"Roger". The controller, who had finally spotted the tiny dot moving off toward one side of his runway, raised his microphone.

"Unidentified terrapin on 17R, this is Regional Tower. You are cleared for immediate departure. Climb-out instructions are: Turn right immediately after lift off, contact reptilian control, frequency your choice. Sixty-one, after terrapin's departure, you're cleared for take-off".

"Sixty-one, roger". "And sixty-one, tower".

"Yessir"?

"Sixty-one, please use caution due to wake turbulence from departing terrapin"!

THE GUILD OF AIR TRAFFIC CONTROL OFFICERS CONVENTION AND EXHIBITION

CONVEX 85

CONVEX BS

WESSEX HOTEL · BOURNEMOUTH 17th-18th OCTOBER 1985

by Geoff Gillett

CONVEX 85

Question :

What is done by both men and women actively and passively, all over the world night and day, both on the ground and even up in the air? Answer: Training.

In their biennial Convention and Exhibition Event CONVEX 85, the U.K. Guild of Air Traffic Control Officers this year chose as their theme: "AVIATION TRAINING - DOWN TO EARTH OR UP IN THE AIR?". The location chosen for the event was the Wessex Hotel in Bournemouth, an attractive south coast resort town which happens to be the location of the U.K. College of ATC, founded in 1949. A little known historical fact is that Hurn (Bournemouth) airport was once the U.K.'s busiest international airport, with over 60 scheduled services per week to all continents. Heathrow, originally planned as a military airfield, was not even constructed till after the Second World War and even then, Hurn functioned as a major diversion for the frequently fogged-out London Airport.

The 1985 CONVEX as officially opened by Mr. David Mason of 'FLIGHT INTERNATIONAL', who admitted to only recently encountering the term IFATCA, in spite of his 5 years as editor! The first technical presentation was given by Mr. Neil Kennedy on behalf of the U.K. Guild and together with various other papers, covered most aspects of ATC training. It was mentioned that the 'failure' rate among U.K. trainee controllers was around the 30% mark, whilst in France the rate is less than 5%. The average age of U.K. recruits has gone down to twenty-one and training time will be reduced from four to two years. One speaker was of the

opinion that fifty should be the maximum age of a training officer with a minimum unit experience of five years. It was felt that a training officer should be accepted by his colleagues rather than just selected by his superiors.

Capt. Bob Cherry of Dan-Air expressed strong feelings about automation. He felt that a constant message that "Automation is good for you" is being fed to us by Industry. Automatic monitoring or shutdown may be appropriate in industrial applications but not necessarily good in aircraft or in A.T.C. Once the pilot (or controller) is "outside the loop", the problem is to train him to stay awake. Similarly, there is a need to continue to train for situations when automation fails. Simulators offer only limited facilities for such training.

In contrast to the previous thinking, Capt. Grieve, Chief Pilot of Britannia Airways, pleaded a case for greater use of simulators, to reduce the cost of pilot conversion to new types of aircraft, towards the goal already achieved by United Airlines of more than 4000 zero flying time conversions.

Although the F.A.A. and the airlines may be satisfied with the costeffective pilot product who has not used the aircraft during training, I personally feel about the same as I did during an I.F.R. approach (at night) to Cairo airport. I discovered during the approach to landing, that none of the crew with whom I shared the flight deck had previously landed at Cairo and were currently experiencing difficulty in understanding the R/T communications. I was even further disturbed when I found

CONVEX 85

out that none of the crew had "flown" the simulator on a Cairo approach. However, we made it!

"Hands-on" training in aviation is my idea of the best possible method borne out of the learning philosophy;

I hear - I forget.

I see - I sometimes forget.

I touch - I never forget.

No doubt readers will agree that there are areas other than aviation in which this can apply -----

The first day of CONVEX ended with a cheese and wine party provided by the 'controller-friendly' airline, Dan-Air who also generously provided a wellstocked hospitality suite for latenight delegates who wished to continue their discussions beyond the hours permitted by the archaic english licensing laws.

The second day commenced with a review of Military A.T.C. training. This was followed by an excellent, informative and entertaining presentation given by Mr. Brian Parkyn of British Caledonian. In addition to having been a former Member of Parliament, he also admitted to being in favour of the duo-decimal system and one hundred degrees in a right-angle! He pointed out the advantages of these and other 'lost causes' before enlightening us about the programmed learning methods in use in BCAL, using technology Swiss in place of traditional 'chalk and talk' methods.

In a paper on English Language Training for Pilots, Mrs. Fiona Robertson outlined the particular difficulties encountered by non-native english speakers.

The work of the U.K. College of A.T.C. was presented by the Principal, Mr. D.J. Morgan and a paper on the subject of Computer Assisted Instruction at the Eurocontrol Institute of Air Navigation Services, Luxembourg, was given by the Head of A.T.C. Training, Mr. J. Rose. He highlighted the value of the computer in creating a feed-back system of inter-active training, which offers immediate analysis of results.

As is customary in CONVEX events, the Corporate Members made a considerable contribution in both technical presentations and displays. Marconi Radar Systems offered a film, "50 Years of Radar" containing very interesting archive material.

Interspersed between the presentat-

ions Open Forum Sessions during which the participants were able to pose questions to the experts. EGATS representatives took the opportunity to raise the topics of increased automation in Air Traffic Management and the Participation of Pilots in A.T.C. Familiarisation Schemes.

The 2nd day event terminated with a Gala Night Dinner-Dance and Cabaret, during which one could renew old friendships and make new ones. The social scene is always an important part of such professional activities and it was with regret that the EGATS delegation said farewell to our hosts, the U.K. Guild's CONVEX'85.



A SUNNY SATURDAY AT KOLN-BONN

by Jürgen Ellermann

On that day three from Maastricht met in Cologne to take part on a photo mission on board of the Condor "CFCF". Mr. Matte, Chief Pilot of Conti-Flug welcomed us at hangar Gl at Cologne airport, second in command was Mr. Cryns.



Ready for departure in the HS 25 from Condor

After a short briefing about the mission; contact was made with Maastricht U.A.C. by landline to Mr. Soudron, the acting Supervisor. He promised us to furnish a controller on a discrete frequency so that the day to day traffic would't be disturbed.

The task was to film a brandnew Condor A310 from Düsseldorf on charter to Gran Canaries in flight. After take-off from Cologne the D-CF was directed by the Düsseldorf controller to join the Condor airbus between NOR and LNO. While climbing to an altitude of 28000 feet we saw the A310 approaching us from the right still below. We were then transferred to the Maastricht frequency.

The photographer was placed on the co-pilot seat and was shooting his pictures, the rest of us of course were at the windows taking pictures as well. A 360° turn was done between LNO and

INPUT

MMD to have the A310 at different aspects and under other light conditions. Shortly before the French border our HS125 broke off to the left and the Condor continued on his way to Spain. Still with Maastricht we're handed over to another frequency.

A continuous descent brought us down for a straight in approach for RNY 07 at Köln-Bonn and we touched down after 43 min. in the air. At the debriefing, everybody got whisky on the rocks in his/her hands, we agreed, that these 43 min. had been quite impressive and even the photographer said that he was satisfied.





The Condor Airbus A310



OL' 36



by Paul Hooper

Miami International had changed considerably since my last visit three previous. For example, the years infamous "cockroach corner", in the northwest area of the airport, had undergone a major clearout. Only a few years ago it had been literally littered with Douglas transports, Curtiss C46s and surviving examples of the inimitable Constellation. It was hard to tell what was operational and what was not; that pile of junk in the corner of an oil-sodden ramp could well be flying next week! The enthusiast can find solace in the knowledge that of the handful of piston heavies remaining most are operational. Nevertheless it has to be admitted that the incomparable roar of four R2800s or R3350s in hardness departing MIA's 9L/27R is all too quickly becoming history. Not so long ago the external appearance of the airport's terminal area provided an additional view of the past with its typical 1950s architecture. This has gone. Remodelled, removed, replaced, re-created. The fifties have finally given way to the eighties.

The terminal facilities can only expand in one direction - to the west between the parallel runways. Expansion has led to a requirement for further aircraft parking space, a problem partly alleviated by the permanent closure of runway 12/30 on November 6, 1985. I was informed that the runway was to be relocated but quite how the problems associated with location of a new runway are to be overcome remains to be seen. In the last couple of years Miami International's passenger handling facilities have been further improved by the construction of a commuter terminal just to the west of the main complex. Although basic in its provision of amenities the new offspring does remove the passenger from the turmoil of the main terminal, albeit via the antiquated method of bussing.

A number of commuter aircraft sat outside on the ramp; Cessna 402s, Bandeirantes - and two DC3s, N35PB and N136PB of the Provincetown-Boston Airline. Resplendent in their red, white and blue livery the DC3s looked every bit as fit for duty as their more modern counterparts, their appearance belying their senior citizenship. N136P, or ol'36 as she is more affectionately known within the airline, is



01'36 on the ramp at Key West shortly after arrival from Miami.

a very significant aircraft. Aside from being one of the world's oldest aircraft still in regular passenger service, 36 has accrued the highest number of flying hours ever to be accredited to a commercial airplane.

36 was to operate the midday flight PT1175 to Key West, a flight I was to join after careful coordination with PBA.



The passenger cabin - looking up the hill!

It was a perfect day for flying; one of those clear, warm Florida days that entice the mind to flirt with the word emigration. Entering the aircraft on the left hand side - 36 was one of the first of the breed to have the passenger door on the left - we were welcomed aboard by flight attendant Jane Hartson. Start up was accomplished without difficulty accompanied by the customary cloud of blue smoke as each engine wound into life. The lunchtime lull in aircraft movements was evident as we taxied out to 27L and into position to hold. Cleared for take-off the power went on followed shortly after by the tailwheel lifting off the runway. To say that ol'36 leapt into the air would be somewhat overstating the case but the airplane certainly seemed far more content in its natural element than confined to terra firma. 36 was making history yet again. The left turn out took us over the single storey suburbs of Miami climbing at 500 fpm to our cruise altitude of 6000 feet. We passed just to the west of Homestead Air Force Base where, not so many years earlier, the ramp had been graced by the elegant lines of the resident Cl21s, alas now discarded and resigned to the arid atmosphere of the Arizona desert. 48 years of age and ol' 36 still retains her dignity as we coast out above the southernmost part of the Everglades and across Florida

bay on a direct track to Key West. Hopes of a magnificent view of the Keys sadly do not materialize as they are much too far to the east. PBA's claim to N136PB (c/n 1997) being the highest time aircraft in the world 18 substantiated by the Smithsonian Institute, to whom the aircraft will be donated when ultimately it is retired.

I think it can be safely assumed that more than a handful of DC3s have exceeded 80000 hours but proving the point is something else. When an aircraft has spent a large part of its life owned and operated by airlines it is a matter of regulation that records



Guy on the left was drunk

and had to be forcibly ejected!

are accurately maintained; but very few DC3s have in fact spent their lives in airline service. Service with third world air forces, clandestine operations, even accidents, sometimes resulting the construction of a hybrid airplane, all go to confusing the issue of record keeping. That 36 had had, and possibly still has, competition for the title becomes apparent when the authoritative works on the subject are scoured, N21728 (c/n 2144) had already amassed 83032 hours by April 1965, only 26 years into its operational life. The total had crept up to 84875 hours by the time the aircraft was donated to the Henry Ford Museum in Dearborn, Michigan in 1975. N222TS (c/n 2120) had over 72000 hours on its airframe by 1966 - and the aircraft is still current. But ol' 36's place in aviation history is already assured so let me not take away any of the glory that she so rightly deserves.

N136PB was delivered to Eastern Air Lines on October 28, 1937 as NC18121. Between June 1942 and June 1944 the aircraft wore the military serial 42-56630 in its service with the U.S. Army Air Force under the designation C49G. It returned to Eastern on termination of its military duties and served that company until ... Unfortunately at this point the aircraft's history becomes a little obscure as different sources offer conflicting information. For sure the aircraft spent a considerable period of time in the state of Texas, initially with Trans Texas Airways passing to Tradewinds Aeromotive of San Antonio on October 31, 1968. One source even suggests that Panam was operator of the aircraft for a time. The Provincetown -Boston Airline acquired N18121 on January 24, 1974 re-registering the aircraft, more appropriately, N136PB.



The left side of the flying museum. Wonder how many hands have been on those power levers in 48 years?

Our flight attendant, Jane, was busy serving drinks, which included a most delightful cocktail with an equally delightful name - Key West Sunset! Circumstances dictated that I retain more than a degree of sobriety. Pity! I figured that the best way to engage the lovely Jane in intelligent (!) conversation was to ask her how she felt about flying in an aircraft of 36's age and fame. Have you noticed how often attractive women put the proverbial damper on a conversation by mentioning their husbands and not the gleaming Porsche sitting back at the airport parking lot or the luxury ocean-side appartment you were hoping to be invited back to. Life is cruel! Anyway, in answer to my question Jane told me that she quite liked the nostalgic aspects of flying DC3s and seeing the reactions of some passengers when they realize they are flying in a DC3,

although she observed that some of them do display signs of concern when the aircraft enters turbulence.

Sitting on the left side of the aircraft I caught sight of the United States'most southerly extreme as we descended through a level of cumulus to position on a left base for the easterly runway. We landed at EYW 47 minutes after departure from Miami. As the last of the passengers filed off the aircraft I climbed forward to meet Captain Dave Allen and First Officer Jim Guest. I watched as Dave entered the sector block times and total airframe hours in the log - 88345,9 hours!

Dave and Jim were taking 36 back up to Miami a little later in the afternoon and the offer to ride jump seat was enthusiastically accepted. During my time at Key West a number of PBA flights came and went, indicating to me the importance of the station on the airline's network. Piedmont's recent incursion into the intra Florida market using Fokker F28s has probably submitted PBA to the most serious competition that it has ever had to endure. It is perhaps a little too early to contemplate the effect this has had on PBA's passenger uplift but initial signs are that the airline's customers are remaining loyal to the prop driven fleet.

Come 4 o'clock I climbed aboard ol' 36 once again for flight PT1178 back to Miami. The jump seat was released from its stowed position and I strapped my personage into it. As can be seen from the accompanying photographs the business end of 36 is a flying museum and. as Dave explained in response to my of question, introduction modern instrumentation to that aged environment would not be possible due to incompatibility with the aircraft's



Notice the state of the art twin VORs just beyond the power levers!

wiring system. Presumably rewiring would not be a viable proposition. If it works, why change it?

I was informed prior to take off that the cockpit noise level was such that the crew are obliged to communicate via a system of hand signals; more than once during the course of the flight these strange antics were to bring a smile to my face. To call that cockpit noisy was an understatement of gigantic proportions. Even with a



Jim and Dave with coach and pair!

headset on my ears took their severest hammering since I don't know when. Ten minutes after take off we levelled at 5000 feet at which point we were recleared to 6000. As on the outbound sector the weather was perfect and the cockpit side windows were opened up as if to prove the fact. I'm sure the guys were unaware that the howling gale that enters goes around the back of the cockpit and hits the poor jump seat jockey full in the neck at 145 knots. Or perhaps they were!! Still my masochistic enthusiasm was not dulled.

The city of Miami was on our left side as we positioned for MIA's 27R. The sun was by now low in the sky imparting a blinding glare as we turned final revealing the previously unnoticed opacity of the windshield. technology precludes captains 1980s sticking an arm out into the slipstream and wiping the windshield. The effect on this occasion was minimal but never mind, the VASIs were clearly visible and evidently provided sufficient guidance to safely complete the approach and landing.

We parked on the commuter ramp within spitting distance of a British Airways Concorde over on one of the piers. One could have talked for hours about the eras separating these two generations of transportation, but somehow nothing needed to be said. It kinda rounded off a delightful day, just as the sun dipped below the horizon.

Paul J. Hooper. My thanks to Dave and Jim and to the lovely Donna Fiala who made all the necessary arrangements.

