

the magazine of the EUROCONTROL GUILD of AIR TRAFFIC SERVICES

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EDITORIAL

The previous issue was devoted to the future of aviation seen from the technical point of view; now what is going to happen on the operational side? Deregulation in Europe will be slowly taking place and this will have a strong influence on our working environment due to the increase in aircraft movements that will be generated.

Deregulation is already starting within regional transport, new rules have been agreed by most countries which give the "third level" carriers a greater freedom to start new routes with more or less free tariffs.

As far as the other type of traffic is concerned there are already several bilateral agreements between pairs of countries (e.g. UK Netherlands, UK Belgium etc...) which are highly flexible. No doubt this spirit will influence other European countries and that the still reticent countries such as France and Italy will have to follow suit.

All these changes will obviously result in a considerable increase of aircraft movements within Europe, thus increasing the burden on ATC.

The present issue although still partly devoted to future technical developments also highlights some medical aspects of concern to the profession of Air Traffic Control, an important subject which seldom receives much attention.

Although this issue contains fewer pictures than usual, I am certain it will be of interest and as usual, we have included the customary humour to help your relaxation from the 'heavy' stuff.

Patrice Béhier

PRESIDENT'S MESSAGE

This INPUT issue describes EGATS' entry into the world of medical studies.

Our stress lecture and follow-up were eye-openers for many of our members and this publication therefore promises to produce interesting spin-offs.

The fact that EGATS is thus drawing attention to the human/medical aspects of the profession is another example of the dynamism of this association.

Other fields of interest i.e. IFATCA, career studies and early retirement will, of course, remain important items on our shopping list.

The introduction of the Amsterdam Upper Sector has in the meantime increased the Eurocontrol Operations staff and this will undoubtedly lead to new ideas and initiatives.

Future INPUT editions will certainly reflect this process.

by Jan Gordts

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WELCOME TO THE AMSTERDAM SECTOR

With the implementation of the Amsterdam Sector at Maastricht U.A.C. on the 1st of March, 1986, a lengthy period of uncertainty with problems of a political and operational nature has come to an end. We are glad that the "gap" between the Brussels and Hannover Sectors is now filled and that the Maastricht Centre is controlling traffic in the upper airspace from the French to the Danish borders and from the North Sea to the DDR border. We shall help to ensure that this is beneficial for a safe, orderly and efficient Air Traffic Control, for the operators and for the flying public.

Of course the whole transfer operation has not been a one man job, but a well concerted action by many people from Eurocontrol Headquarters, Maastricht UAC, the RLD and the Military ATCC at Nieuw-Milligen and I would like to express a word of gratitude to all concerned.

For the 15 (ex-Amsterdam ACC) controllers who are now integrated with their Eurocontrol colleagues, not only in the manning of the Amsterdam Sector but also in the Operations Room at the Maastricht UAC, I do hope they feel at home both professionally and socially and I am convinced that they will experience an atmosphere of "controller-camaraderie" and an excellent "esprit de corps".

Every Air Traffic Controller will appreciate that, although their goal is the same, controllers from different centres also differ in their working methods (mainly caused by other, more or less sophisticated equipment).

by Willem Pieneman

Experience shows, however, that after a familiarization visit to another centre, one can learn a good deal from each other and, as was the case with the arrival of the Hannover Sectors in 1974, it does not take too long to benefit mutually from each others' experience and viewpoints.

Looking forward, there is a challenging period ahead of us: the tuning of procedures, refinements for software and hardware, working with new coordination partners at the interfaces, etc... but with the help and cooperation of all concerned almost any problem is surmountable.

My very best wishes to all of you for continued success in providing an excellent service to our airspace users in the "Maastricht Area".

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EMERY TAKES ON THE WORLD by Jo Florax



Emery Worldwide was born in 1946 founded by John Emery Sr., and prospered to become one of the premier freight forwarders in the United States. Emery is doing well, but then so is the entire domestic small package/express delivery business, as well as freight carriers domestic and international.

What makes Emery differ from other air carriers like Federal Express and United Parcel Service? That can be found in Emery's operating philosophy: the differentiation of Emery's service and the attention to that. Emery considers itself as the least discriminating hauler of overnight freight in the U.S. Emery does not care what the load is, big or small, short haul or international. The heavy loads that other overnight haulers avoid, are Emery's golden goose making them unique for overnight delivery, as other carriers have limited their parcels up to 150 pounds, while UPS (United Parcel Service) has raised its maximum weight from 50 to 70 pounds.

Emery handles all its freight, big and small, in its hub complex in Dayton (Ohio, USA), a sorting and distribution hub. In 1981 Emery launched its own carrier service and hub operation into

the radically expanding overnight delivery market. Many thought it to be a sure disaster but Dayton is running quite well and turned out to be an excellent choice in the heart of the industrial U.S.A. And the hub is designed to be expanded almost without limit; the land is available and ready to use (i.e. in the not too distant future Dayton will be an international airport and a free trade zone.

The hub can handle two million pounds nightly. What does a typical night in this hub look like? About 46 aircraft and 22 trucks are converging on Dayton, with hub activity peaking in the 2 - 4 a.m. period. These aircraft and trucks depart, some headed to mini-hubs where smaller aircraft take loads to communities not easily reached by one of the firm's 2,000 trucks. As more companies disperse their plants worldwide, Emery's international business has been growing even faster than the heavy-parcel sector. Emery estimates that its international freight forwarding unit will yield more than \$1 billion in annual sales by 1990. The international arena seems to be the next great growth opportunity for air freight.

As an international freight forwarder, Emery offers a wide range of

EMERY

WORLDWIDE

services and prices to the shipper. Same Day Service and 9 a.m. Service are for those super-rush jobs, while less urgent items can go on standard Emery a.m. Service, Emery p.m. Service or even Emery Day 2 Service. Or, on international routes, Emery can put one's goods on a boat, or ship it by aircraft with door-to-door delivery, with all charges included in a single price. This international door-to-door service has been introduced in 1983, providing shippers with one-company handling of air courier shipments of any size, weight or value. And there are varieties of services in-between.

At present Emery Worldwide still functions strictly as a freight-forwarder for international cargo. They don't want to be a cargo airline but a cargo system and leave the airline business to those who know what they are doing. The aircraft operators maintain the aircraft, resulting in a high cost-effective system.

New Federal regulations on airplane noise and emissions took effect on January 1, 1985. The new standards require the major airlines to either replace or extensively modify the engines on many of the freighters they have been using to haul cargo. Many carriers did not consider their air freight business worth the trouble and expense of modifying the planes, but Emery has been able to buy used airplanes at bargain prices and has upgraded the engines to the new standards, picking up some business the airlines relinquished. Since 1981 the fleet has grown to 53 aircraft. The figure below shows the various types of aircraft presently operated by Emery and a comparison in pounds lifted 1982-1985.

All the Emery fleet is leased, except for a number of 727s and even these are operated by other companies under contract to Emery. The DC-8-73s were bought by Emery and then resold to firms needing investment tax credits and leased back for 15 years, with Emery retaining a purchase option. The fleet now complies with noise regulations. "In the future Emery may look at other types of aircraft like DC10 and B747" says Mr. John Callf, Manager HUB Operations Continental Europe, referring to the international route network of Emery and the wide distribution of Emery agents around the globe. Red Emery aircraft are now already seen in many countries and Emery's choice of Maastricht Airport is based on its central position at the crossroads of major east/west, north/south motorways and within 200 kilometres of 50 million people and 150,000 companies. Emery operates all-cargo flights between Europe and the United Kingdom and the United States, six days a week with two of its DC-8-73s providing nearly 550,000 kilos of airlift weekly (planes equipped with quieter General Electric CFM56-2 high bypass engines). So Emery customers in Amsterdam, Brussels and throughout Europe will be aided by the strategic location of Maastricht Airport. There, Emery's Continental Europe Superhub operation will be accommodated in the short term, with a facility of 4,000 square metres. In the eyes of Mr. John Callf, he considers the construction of the new runway at Maastricht Airport to be essential for Emery's future expanding activities.

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Another method of transport is the so-called "ZAPmail", a new electronic mail business system, operated by Federal Express who encounter losses on this system. Emery was very cautious about Zapmail as they thought the market is no longer sufficiently large. This system could easily be overtaken by technology using leased telephone lines.

In 1977 the air cargo industry was deregulated. Emery compares the international air-freight market to the American market before it was deregulated in 1977. A similar patchwork of regulations prevents Emery from operating its own fleet abroad, as the growing volume of freight being sent across international borders is increasing the pressure to ease the restrictions. This will be the time that market forces would encourage foreign airlines to enter joint ventures allowing American air-freight companies into their airports.

Emery's commitment to the future can be summarised as:

Company commitment to service, excellence and superiority

- No "me too-ism"

- Air cargo and air courier

Marketing strategy: any size, any weight, any value, anywhere in the world

Build on strength of U.S. domestic network

Develop new services to keep competitive edge.

Nowadays Emery employs over 7.000 people and more than 179 offices all over the world. Besides that, official Emery agents act on the company's behalf in another 40 countries: the Emery Customs Brokers, making this all-inclusive service possible.

But Emery is ready for the future, ready to operate their fleet abroad whenever that becomes possible in the international arena where the next great growth opportunity for air freight is to take place and which Emery wants to dominate.



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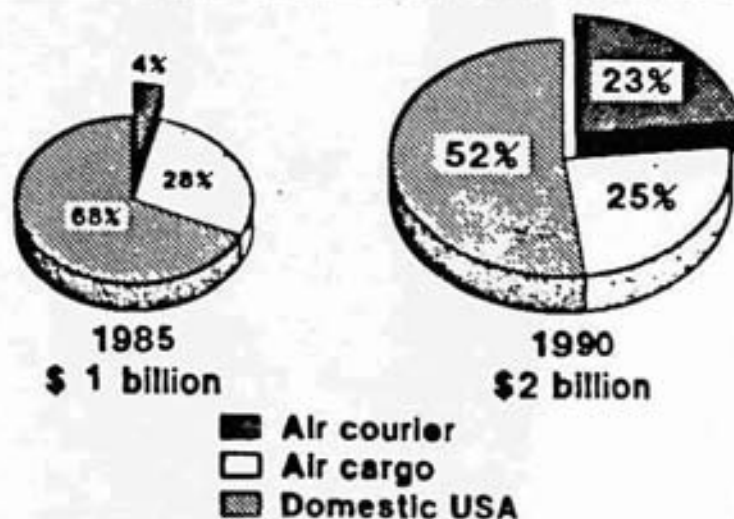
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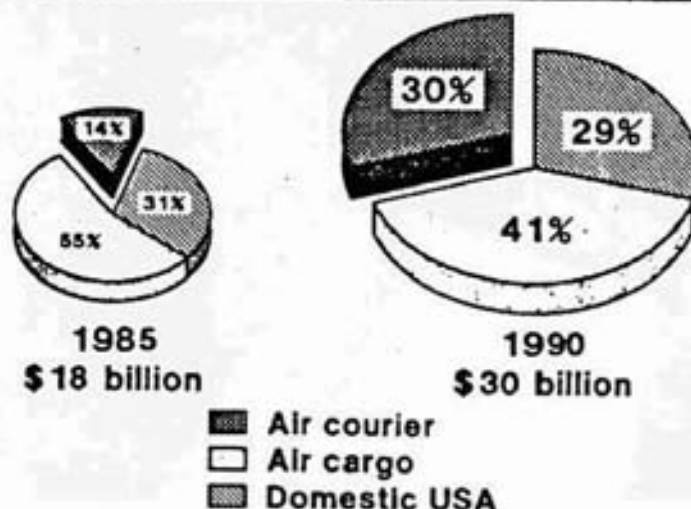
Fleet Serving the Superhub

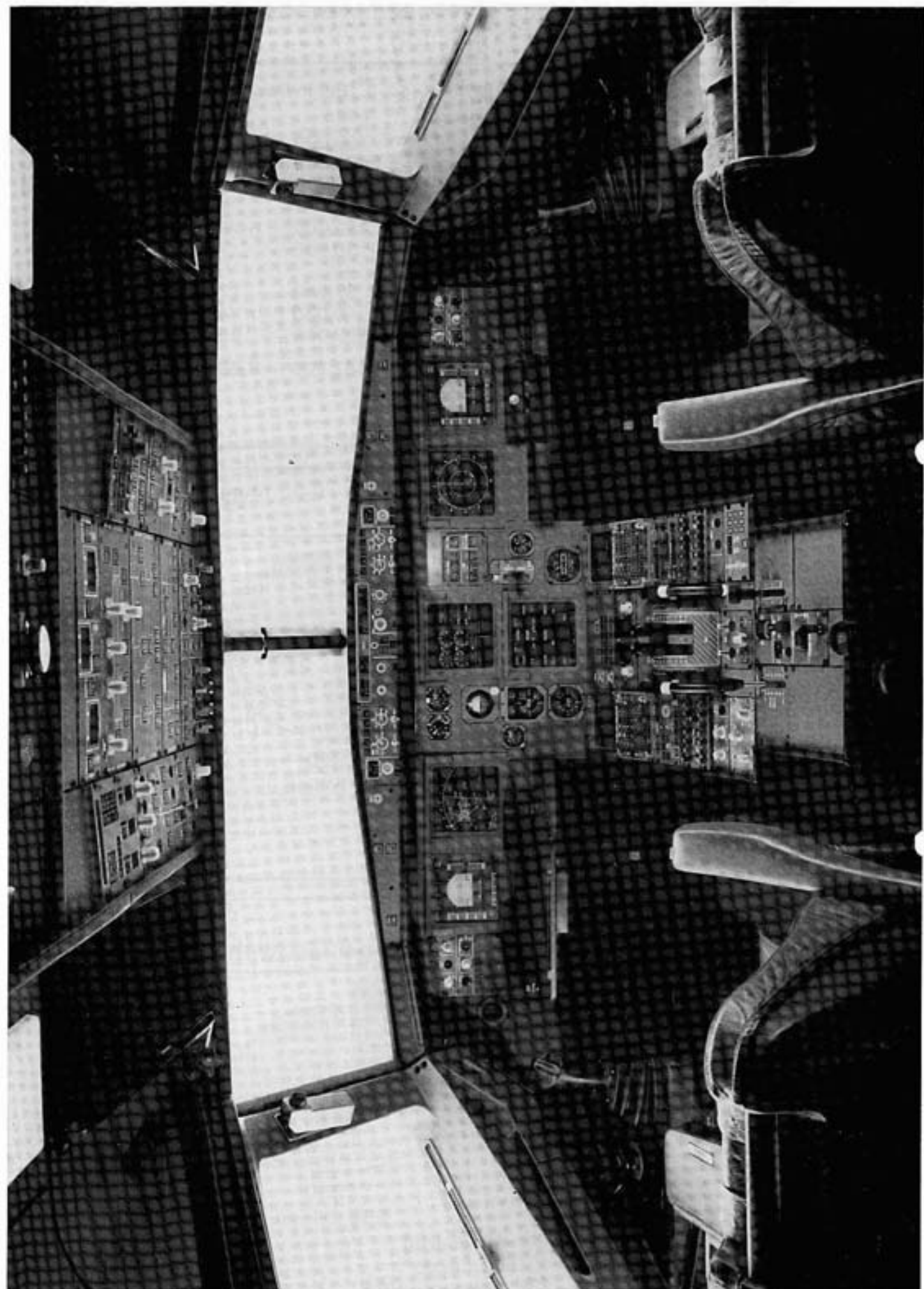
	Number		Lift in Pounds	
	1985	1982	1985	1982
DC-8-73	7	—	700,000	—
DC-8-63QN	6	—	600,000	—
DC-8-63	1	—	100,000	—
DC-8-33/54	—	4	—	216,000
727-100	32	18	1,452,000	792,000
DC-4	2	—	36,000	—
DC-3	—	1	—	7,500
Convair	3	14	37,500	175,000
Small craft	2	13	5,000	44,500
Hub trucks	23	19	552,000	456,000
TOTAL	76	69	3,482,500	1,691,000

Emery Growth



World Air Courier/Air Cargo Growth





AIRBUS - A320

AVIATION TOWARDS 1990

by Jo Florax

Today's calculations are all based on a dollar per gallon situation. The commercial justification for revolutionary technology in the 100-seats market becomes more difficult when calculations are based upon 80 cents per gallon. The most important factor in lowering Direct Operating Costs (DOCs) is the predicted fuel efficiency of the new propulsion systems. That efficiency can best be exploited on medium haul stretches. Eight years ago forecasts of the mid-80s indicated that fuel would be scarce and account for nearly 50% the airline cost structure. The reality today is quite the reverse, with fuel at 25% against 44% in the past.

The development costs of major technical advances can best be borne by the bigger capacity aircraft for reasons of scale.

It is very likely that the package of new technology, supposed to be available in the early nineties, will first be applied in a 150-passenger aeroplane. Returning to the options, to design and develop a derivative aircraft or to go for an all-new aeroplane, Mc.Donell Douglas has adopted the first solution and Boeing the second one. What is theoretical in this given situation?

Based on the well-known calculations both companies claim DOC improvements of about 5-10% relative to new aeroplanes in the 1988/1989 time scale, a figure which is a bit low compared to earlier major innovations.

Figure 1 shows the current viewpoint of MD and Boeing on the improvement of DOCs (1 US \$ per gallon). At today's fuel price of \$ 0,80 a large part of the technical efficiency improvement cannot economically be exploited.

Developments in the next generation of 100 - 150 seater aircraft. The Fokker vision on the market.

Both policies are extremely difficult issues, but take the Boeing approach. This requires tremendous capital outlays, but has the advantage that it may produce the first version of an aircraft with longterm (growth) potential covering a very broad spectrum of payload range applications. Now for the M.D. approach, that of powering an existed but modified aircraft with a new engine. This will result in an aircraft that requires lower capital out-

lays but it may be at the end of its growth potential and therefore suffer the penalty of having a very limited spectrum of payload applications. You may draw your own conclusions from these two options which determine the face of aviation in the nineties. It seems to be a policy for a "high risk revolution".

Figure 2 shows us the number of top airlines of the western world, grouped by productivity, that have committed themselves for the A320, MD80, 757 and 737-300.

It is possible that these trend-setting airlines are not yet convinced about the technical feasibility and economics and, given decreasing fuel prices, they go in massive numbers for aircraft of 1985 technology in the 130-160 seater category.

Fokker for example, strongly believes there will be a tendency to go for smaller aircraft, also on the dense traffic flows. The "smaller is better" philosophy is being applied by United Airlines, Delta, North-West, US-Air, Piedmont and SAS to mention a few.



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WINGS CALENDAR 1986 f 48,05

Superbly produced glossy calendar with air-to-air colour photos of U.S. Air Force aircraft such as SR-71, B-1, F-15, F-16. The dramatic photos were all made by Time Magazine photographer Mark Meyer. 13 sheets. 45 x 35 cm formate.

The FLASH Luchtvaartboeken catalogue 1986 (in Dutch) is sent free of charge on request.

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THE UNDUCTED FAN

The desire to maximize the return of scarce, development dollar expenditures in the fields of aircraft gas turbine engines prompted an investigation of numerous engine configurations, to evaluate the benefits each might provide. From this rigorous study, which included interim contacts and feedback solicitation from airline, airframer and military personnel, the design of the UDF evolved from NASA advanced propeller technology.

The UDF is a new type of engine developed by General Electric. The UDF employs a counter-rotating, highly-loaded, unducted fan driven by a counter-rotating power turbine. The drive connection between the fan and the power turbine is direct, i.e. no gearbox is employed, since the counter-rotating turbine is capable of running efficiently at low tip speeds due to the vector diagram effects provided by counter-rotation.

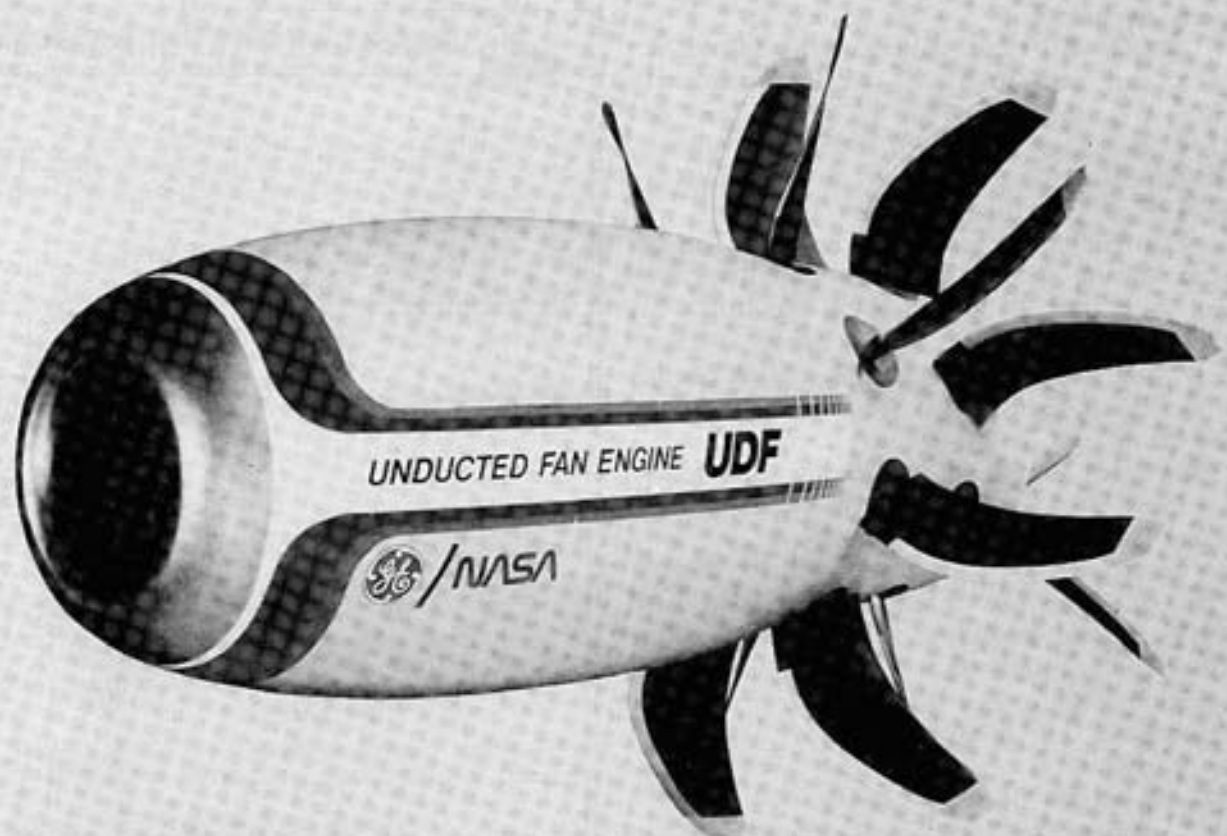
By using the UDF engine as a "pusher" - in an aft fuselage mount - the blade noise source is behind the pressure bulkhead and assures cabin noise levels that are comparable with

today's high standards. The new concept will have its first commercial application on short-to-medium range subsonic transport aircraft in 1990.

Flight testing of the UDF is planned for 1986. A three phase programme is presently in place being executed, to establish the experience and technology necessary to launch a production engine certification effort. This programme consists of Scale Model Fan Blade Testing, Full Scale Demonstrator Engine Design and a Flight Test activity to assure airworthy performance of all engine systems.

Tests will be executed on a B727 and on the MD-80.

The UDF provides the fuel savings and overall economics needed to revolutionize the industry, much the way the ducted fan did, when it replaced the pure jet. The expectations are considerable. The UDF will reduce fuel burn by 40 to 60% over standard body twin-jet and up to 25% over the ducted fan engines of comparable technology available in the next decade.



DEFINITIONS

DRAFT HEADINGS.

Definitions

Etes-vous avec le? (Are you with it?)

Do you speak the international aviation language?

How to become acquainted with air traffic control phraseology?

Air Traffic.

A concentration of aircraft over a given point each requesting the same flight level and each having the same priority.

Air Traffic Control Clearance.

A verbal method of compelling a pilot to fly a route and flight level he otherwise would never have chosen.

Cruising Level.

Any level other than the level requested by the pilot, or any level maintained by the pilot other than the level last approved by Air Traffic Control.

Flight Plan.

Information filed by the pilot which communications can manage to lose or otherwise withhold from ATC.

Expected Approach Time.

The time issued to a pilot to make him happy while attempts are made to figure out what to do with him.

Predetermined Route (PDR).

An air route established for the sake of General Air Traffic where only those military aircraft are allowed to fly which are not known to any control agency.

Operational Air Traffic (OAT).

Military air traffic, although able to follow ICAO rules and procedures, escaping air traffic control in order to avoid inconvenient clearances.

General Air Traffic (GAT).

That air traffic in the Upper Airspace which believes it's being controlled.

SECURITY FLIGHT

"Censored"

Cone of Silence.

A radio navigational facility used by aircraft experiencing communication failure in order to make a routine position report.

Area Control Service.

An air traffic control service established for IFR flights in controlled airspace.

Bilateral Agreement.

A one sided agreement between two parties.

Convention.

A multipartite agreement embodying the unanimous disagreement by all contracting parties at the moment of signature.

Operating Budget.

Estimates made in the year following the actual expenditure of the amounts which should have been insufficient for the sums actually spent.



POSSIBLE APPLICATIONS OF ATC DATA LINK

by Raymond J. Hilton

manager ATC data systems
Air Transport Association

Background.

Data link was first proposed in 1947 when the Radio Technical Commission for Aeronautics (RTCA) established a special committee (SC-31) for a Universal Air-Ground Digital Communications System. During the 50s and 60s interest in data link vacillated pro and con by providers of ATC services and the aviation community, both nationally and internationally. In the early 70s FAA followed through with the ATC Advisory Committee Report, which included data link as an optional component of the Upgraded 3rd Generation ATC System. Later studies and experiments at the Transportation Systems Center, MIT Lincoln Laboratories, MITRE and NAFEC established the Discrete Address Beacon System (DABS) data link as the best technical approach for system implementation, and this concept led to what is now known as Mode S data link.

Introduction.

The implementation of National Airspace System (NAS) En Route and Terminal Automation, Central Flow Control, and National Flight Data Center Automation has provided an enormous data base for considering sophisticated automatic air traffic management techniques. The forthcoming Flight Service Station and Weather Automation Programs will provide more current and accurate weather and other flight information to the pilot for the purpose of planning and executing flight operations.

Conversely, information regarding the environment in which the aircraft is operating, and information about the actual performance of the aircraft is needed on the ground to improve the tracking and prediction of aircraft position, and to aid in determining winds aloft and weather. All of these improvements will require a large increase in the amount of information exchanged between air and ground. This exchange will require a digital data

link capability between aircraft and ground to supplement the ATC voice communication channels presently used.

The Mode S data link will provide a digital data link capable of satisfying some of these communications needs. Initially, data link will be used in parallel with voice communication, to relieve channel congestion while increasing air traffic services without increasing pilot/controller workload. Ultimately, data link is intended to replace most of the voice communication, and increase automation potential in the ATC system.

Development and Implementation Philosophy.

Data link is the catalyst which may lead ultimately to total automation of the ATC system. A basic objective of the FAA development and implementation philosophy is to provide ATC and flight information digital data services to a wide range of users (airlines, general aviation, and military), employing a variety of input/output devices such as cathode ray tube (CRT), light emitting diode (LED) printers, electronic displays, keyboards and touch displays, associated with a transponder.

After Mode S is implemented, data link services can be introduced in an evolutionary manner. The development fits conveniently into three suggested phases (NAS near-term, NAS far-term, and advanced systems development) as described below.

NAS Near-Term (pre 1990).

Depending upon progress in the Mode S implementation program, data link service could begin in the late 1980s. The initial data link formations, selected by various ATC and system user groups, will require minimum involvement by controller and pilot, in transmitting and receiving the various items of information. The functions may include:

- Confirmation of assigned altitude;
- Minimum safe altitude warning;
- Runway surface winds;
- Runway visual range;
- Confirmation of take-off clearance;
- Selected Automated Terminal Information Service (ATIS);
- Selected weather data.

It is expected that the data link transmission of these items will tend to unload voice communication channels and that the additional operational benefits will tend to promote the implementation of data link by the system users.

AAS
ATC SECTOR SUITE DISPLAY



COCKPIT DISPLAY



These data link services were technically demonstrated at the Lincoln Laboratories DES Experimental Facility (DABSEF) at Hanscom Field, Massachusetts in 1978.

Far-Term (Post-1990).

Today's ATC automation system does not provide any tactical control support to the pilot and controller. The information contained in the existing system is used for strategic planning and for monitoring aircraft movements. The current plans for enhancing the existing en-route and terminal automation programs include the automatic generation of conflict-free aircraft instructions. After 1990 it is planned for the automation system to generate at least the following ATC instructions:

- a. Conflict Alert and Resolution Instructions;
- b. Holding Instructions;
- c. Approach and Departure Clearance;
- d. Metering and Spacing;
 - heading
 - altitude
 - speed
 - time to execute ATC instruction.

These ATC instructions will be relayed via data link for those aircraft which are equipped; otherwise, the instructions will be relayed via voice. Other information transmitted by the data link will include weather, Notices to Airman (NOTAMS), Airport Terminal Information (ATIS), wake vortex and wind shear information, and other terminal information, such as flight plan beacon code, active R/W,

standard taxi route, standard instrument departure and arrival, etc... This information combined with the automatic generation of ATC instructions will certainly require a digital data link, with well engineered man-machine interfaces for initiation, receipt, display and acknowledgement of information.

Advanced System Development (Post-2000).

Planning for this era of ATC system development begins to employ very advanced automation technology in the air and on the ground using voice communication only for non-routine situations or when serving aircraft not equipped with data link.

The existing en-route and terminal automation hardware will have been replaced by that time. Digital data link will have been implemented and many aircraft cockpits will have been improved with better displays and flight management computers.

Air traffic management communications at this point will be largely automatic, with controller and pilot in monitoring roles. The initial implementation of this design will involve the controller and pilot as active observers initiating and acknowledging computer-generated air traffic management and flight operation information. The system will eventually evolve to passive monitoring by the pilot and controller to provide for manual takeover in the event of system failure.

All the functions identified in the pre and post 1990 eras will be included in the advanced system of post 2000.

Questions regarding the concept of future air traffic management will have been further addressed and functional definition and distribution of controller and pilot responsibilities will have been defined.

Conclusion.

It has taken more than three decades to satisfy all the basic needs for providing a digital data link system. The voice link has become congested for air traffic management, company communication and flight information services. Traffic will continue to grow, tending to aggravate the voice link congestion problem. More air/ground communication for ATC and flight information services will be needed as airports and airways become more congested. Meanwhile, technology is advancing rapidly to the point where costs for improved avionics will be within reach of the many varied users of the system to receive the additional services which can be provided.

Mode S in itself, strictly as an improvement to the ATC surveillance system, can be questioned on a cost/benefit basis; however, when data link is considered as an integral part of Mode S, providing combined services of improved surveillance, and all the services made available by digital data link; e.g. weather, ATC, and flight information services, the total system of Mode S/Data Link is justifiable.

In order to assure that data link is acceptable to the providers and users of air traffic management services, the initial functions chosen for the application of data link must be selected very carefully. The goal should be to increase services without significantly increasing controller and pilot workload, and to motivate the increased use of data communications. Subsequent choices of data link functions must be based upon increased automation in the provision of air traffic management and information services which lead to increased productivity for the users and providers of these services.

by permission of ATCA journal

- July 85 Issue

HAPAG LLOYD — COCKPIT CREW-CONTROLLERS MEETING

by Philippe Domogala

Last February, 35 of us boarded a bus and went to Düsseldorf to meet Hapag-Lloyd pilots and our Düsseldorf ACC colleagues.

The evening was arranged on the initiative of Capt Behrendt, Chief Pilot of HF and took place in a first class restaurant near the Rhine, in the presence of the Managing Director of Hapag Lloyd Flug, Mr. Wülfers.

After an excellent dinner, lots of local beer and superior (french) wine helped everybody to participate in the discussions.

Our Düsseldorf colleagues were well represented and numerous semi-technical discussions took place, that will I am sure, smoothen even more the already very good cooperation we enjoy with them.

This excellent initiative finally enabled us to meet our flying and adjacent partners face to face in a relaxed atmosphere. This is the best way to understand each other's problems and to start a cooperative basis.

After the evening I remembered something a lady once told me: "You controllers are a strange breed, when you are supposed to work you are talking about everything but aeroplanes and when you are supposed to relax at home or in a social event, you are only talking about aeroplanes ...".

Anyway, we really enjoyed our evening, and thank you Hapag for this initiative.

What is a „sort box"? It is a sort of a box to sort out all sorts of problems by means of a box

MEDICAL MATTERS

by Norman Brown

Subsequent to my epic diatribe on stress and its problems, in our previous issue, it was my intention this time to have a go at fatigue. But I found it too tiring. Not only that, but neither could I think up anything brilliantly witty and intelligent, bearing in mind that few of you are sufficiently proficient in the English language to appreciate fully my extensive vocabulary. To the few of you still with me, who understood that last sentence, I apologise (very quietly, in the Continental manner).

So this time I devote my attention to the subject of "keep-fit". This will give me the opportunity to introduce once again one of my Grandfathers. The discerning reader will remember from our last issue that my Grandfathers were possessed of a rather aggressive attitude to the world in general; traits which I gratefully inherited.

Now it is an unfortunate fact that keeping fit involves exercise. Yes, I know that it's tragic, but there is no escape. Doctors will tell you that what you don't use will rot - waste away slowly. Which might explain what happened to most of my hair. How, pray, does one exercise one's hair? Hairies kindly respond.

Sports (Ugh!) to keep you fit and trim. When I was in the Royal Air Force, we maintained ourselves to a peak of physical fitness with a strict regiment of darts and dominoes, and a diet of Newcastle Brown Ale (known colloquially as "The Broon") and Guinness. Britain and her Empire (it was some years ago) prospered. For recreation we played rugby, cricket and, for the less intelligent, soccer; but none for fitness, only recreation.

Then along came squash, decimal currency and the E.E.C. and look what happened to our happy Empire. I won't say that I am disillusioned by Europeanism, but after all I was brought up to believe that the most effective Europeans of all time were Attila the Hun and the Duke of Wellington.

In my Grandfather's day the British Army had a most efficient way of keeping fit, it was called "War". The Grandfather after whom I was named - Norman - served for many years in the British Army, Duke of Wellington's West Riding of Yorkshire Regiment. They kept



very fit fighting almost everyone remotely foreign. The more remote and foreign the better. My Hero. He also played rugby for recreation.

He had a way of conversing with those unfortunate enough not to understand fully his rather idiomatic English: he would simply speak louder and louder until the miscreant's will-power was bludgeoned into acceptance. My brothers and I spent many happy childhood hours listening to him explaining to French persons the intricacies of the Yorkshire dialect. The only person he never completely defeated was a Parisienne of delightful aspect; he was after all a gentleman you see.

He joined the army at the tender age of fifteen years and, when I signed up for the Royal Air Force at eighteen years of age, he quoted to me what his father had told him, "Well lad, tha's done it, tha makes a man or a mouse o' thiself". I think even the least erudite of my readers (assuming you're still with me), will understand that. Squeak, squeak.

He it was who explained to me the intricacies of the Lee Enfield. 303



inch rifle, still in use during my service time. This knowledge enabled me to murder more empty beer cans on the range at Labuan than all my contemporaries combined. While I was in the Far East we corresponded regularly, and he enjoyed tremendously my rather youthful exuberance as I explained the advanced weaponry of the age, and its effect upon the local population's understanding of the British way of life.

Some time ago, I seem to remember starting an article on keep-fit. Digression being a marvellous substitute for ignorance, I then re-introduced my Grandfather. Ah, yes! sports to keep you fit.

This being a family magazine, or at least one that may be read by the family by accident, the most enjoyable - or

so I am reliably informed - form of exercise can not be named. Which is a pity, sex and its attendant problems being a major preoccupation in our troubled times.

But worry not, I - Scoop the Triff - assure you that sierra echo x-ray is here to stay. A doctor somewhere once said that sierra echo x-ray is the most effective form of exercise known to man. The poor soul had obviously never tried whisky alpha romeo but can be forgiven his ignorance.

Ramble, ramble, I don't know about you, but I've had enough of this drivel. Some idiot wrote with a problem, so read on.

The Medical Adviser handles your Queries.

Dear Doc,

I recently bought a computer.

B.O. Smells.

The M.A. answers.

One assumes from the simple statement the following:-

- a) You are married, with child(ren)
- b) You suffer from insomnia
- c) You don't like animals
- d) No-one like YOU.

Hard luck.

The only cure is to unscrew the back of the machine, plug it in, switch on, lick your finger and run it all over the exposed electronic bits. That should cure you for good.

End.

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STRESS AND DISEASE

by Dr. J. Remans

Every second of every minute of every day of your whole life, the nervous system receives about one hundred million messages. These messages originate from all parts of our body:

- the sensory reception : hearing, sight, smell, taste, and touch;
- the interoceptors which pass on what the internal organs are doing;
- the chemoreceptors which deal with the chemical condition of the blood;
- the proprioceptors which tell what the muscles and tendons are doing;
- the higher braincentres: expectations, thoughts, memories and all sorts of thinking.

A great number of the messages which reach the brain, cause no reaction whatsoever. Reactions occur only when the perception of the stimuli is either intense or frequent.

Stress is a process in which the conditions of the environment or the events (stressors) disturb the existence of a person, and in which this person reacts to that threat.

Parts of this process are:

- the perception of the situation;
- the specific stressing factors;
- the individual reactions of a person;
- how the stress is dealt with, what is known as "coping".

Although stress doesn't have any specific causes, the manifestation, the General Adaptation Syndrome does have some specific physiological characteristics which can be grouped in three phases : the alarmphase, the phase of resistance, and the phase of exhaustion.

Stress can be divided into two general categories:

1. Stress originating from a lack or an excess of stimulation.
2. Stress concerning ambiguous or conflicting stimuli.

Another classification of stressing factors is based on two general aspects of a given situation:

1. The intensity or the seriousness of the conditions;
2. The duration of the conditions.

Reactions to stress are divided into three classes:

1. Physiological reactions;
2. Psychological reactions, which can be either of an affective nature or a cognitive nature;

3. Changes in behaviour.

In the study of the relationship between the psycho-social factors and health or disease, there is a gradual development of the biomedical model into a bio-psycho-social model of health and disease.

Neurophysiological, genetic and other biological determiners will not be discussed in this exposition. The connection between psychosocial variables and health problems will be demonstrated through:

1. Radical events and changes in one's personal life;
2. Social changes;
3. The burden of one's work.

Work should give self-respect, intellectual and physical satisfaction and financial security. Tensions, however, depend on the working-conditions.

Studying the influence the strain of work has on health in the long run, research has been done on the life and work of air traffic controllers.

Air traffic controllers have a considerably higher blood-pressure than other workers at an airport. What is more, the work in an area with heavy air traffic is correlated with a high blood pressure compared with the work in an area with little air traffic (Cobb & Rose, 1973).

Next the relationships between physical health change, psychopathology and work responsiveness to cortisol and growth hormone secretion in air traffic controller. In contrast to expectations, those who had the lowest rates of mild to moderate physical health change, showed a modest tendency to have higher average cortisol. Those men who experienced more psychiatric symptomatology in terms of impulse control problems, alcohol abuse and subjective distress had slightly higher average cortisol values at work. Those men who responded to increased workload with increases in cortisol, possibly reflecting increased job involvement, also had higher average cortisol. Physical health change, levels of psycho-pathology and cortisol responses to increased workload were statistically independent predictors of average cortisol levels. The biochemical parameters (renal excretion of catecholamines, lipid metabolism, cholinesterase acti-

vity in blood, excretion of sodium and potassium in the saliva) and psychological parameters (attention, concentration, anxiety, rate of information processing) of controllers were determined immediately before their work shift. Most of the parameters were significantly changed.

As a very remarkable example of working stress we can mention the results of the examination of the ground staff of the NASA spacecentre in Cape Canaveral, Florida, during the last years of the moon-landing project (Baum, Singer & Baum, 1981). These staff had a very exacting job and they were confronted with a paradoxical situation. Everyone knew that upon reaching the aims of the project, finances would be cut. So success of the project at the same time meant unemployment. Towards the end of the project, the consumption of alcohol and the divorce rate increased. But there was also an increase in the number of sudden deaths with young employees, mostly due to heart failure. An increase of almost 50% occurred, compared with the average rate of mortality for this age group. The number of deaths reached a peak when the moon-landing project was ended and in the ensuing year, when many people were discharged.

The results of the examinations concerning working stress do not necessarily lead to the same conclusions.

In their report Rose, Jenkins and Hurst (1978) come to exactly the opposite conclusions for traffic controllers in their study of hypertension.

Analysis of the 1981 Professional Air Traffic Controller's Organization strike suggests that workers who employ the concept of stress to describe undesirable job conditions risk unexpected negative consequences. In deciding not to make subjective claims that can only be addressed in political terms, workers necessarily appeal to outside experts to provide scientific, objective descriptions of job conditions. Unfortunately, different experts define stress in strikingly different ways, allowing for a kind of shell game in which the very existence of stress can become problematical. In addition, the stress experts have been unable to offer more than weak data to support the theories that link difficult working conditions to pathological outcomes. Thus workers are likely to lose labour disputes that depend on the stress discourse.

With these examples we illustrate the relationship between conditions and disease. But at the same time it is clear that these studies, which are mostly of a correlational nature, are not sufficient to understand this connection. Individual personality, the degree of experience in dealing with radical events and social support also can determine whether stress will lead to sickness or not. Changes may lead to sickness if,

- a) a person has only little support of others,
- b) if he has never before met with such an experience, and
- c) if he has an inflexible personality.

When these variables are implied in the analysis, one can better understand how not everybody "succumbs" to psychosocial stress.

When a person perceives a menacing situation, he chooses from a number of possible reactions, and he decides on the way to cope with this threat, in order to transform this situation into a more favourable one. This active transforming of a situation is called "coping".

How can people be taught to cope better with stress? By:

- Promotion of coping with stress on an individual level
- Orientation towards the problem,
- Regulation of emotions,
- Cognitive restructuring and positive thinking.
- Promotion of coping with stress on a collective level.
- Promoting good social relations,
- Improving the organisation in change of structures or change of functions in these structures.

Conclusions:

Certain events and circumstances can lead to certain individual reactions which can have a physiological, psychological or behaviouristic nature. Eventually these reactions may lead to sickness or related conditions, such as being unfit for work. It seems that also individual personality and social relations are important in this matter.

People try to cope with stress in many ways. The personal interpretation of a situation is very important. It is this interpretation which to a high degree determines what a person experiences, how he behaves and how he changes the environment.

Thus, people construct in a sense their own reality.

SEA FEVER

Horatio Cowan

I must go down to the sea again, to the lonely sea and the sky. I left a pair of socks there once. I wonder if they're dry!

The sea has held a fascination for most people down through the ages. From Noah and the Ark, to the latest super surfboard. It is surprising the amount of boat owners there are in ATC and the flying business. How many pilots and all sorts of individuals in the aviation world cannot wait to throw away the headset, stick on the dirty old salt stained cap, bang the wife in the boot of the car and head for the coast!

This of course is the theory! One usually starts some number of years previously with a lovely little dinghy (which the bank manager has allowed you to overdraw for). Two or three years later you think wouldn't it be nice to use all that stuff about navigation and radio which you learned 20 years ago, and more or less never had the chance to use. You now come to the big one! Yes I mean the boss! If you can convince her you've got it made! If you are very lucky she might be one of the females who take the yachting like a cat to cream.

Yes chaps its YACHTING now! Gone are the days of the wet bum. The fact that costs have escalated by 3000 per cent are ignored (this by the way means, you are already far gone in the sickness) the only important thing is to get off down to the coast. If you have been paying attention you will realise that this is where we came in!

We now, in the cold winter months begin to plan the spring and summer schedule. By using the very expensive

equipment that your employers provide to speed passengers many thousands of miles across the oceans at 500 kts, it is possible to compute 6 kts and a 150 mile trip across the channel! After picking up you duty free and checked the opening time of the pubs in Ramsgate it is time to best sail. Its normally you and the missus, as by this time all your friends (having been on one trip) are all in Majorca. Having cast all care to the winds, (not too strong) you find yourself somewhere at zero feet below airway green one. This is where the navigation comes in handy.

All those contrails at FL350 are heading for Dover! After getting boozed for a week in Ramsgate, one picks the right weather, and you only have to repeat the same process backwards to get back to Ostend. Is'nt it simple!

If you are unlucky enough not to have a boat, you can simulate the experience. Get in the shower (preferably in your best suit) turn on the cold water and start tearing up 100 guilder notes. Bye for now, see you on the funny farm!!!

P.S.: Drowning is a very serious disease for which, up till now, there is no known cure.



HOW TO AVOID STRESS

You will understand that there are several methods of avoiding and treating stress. Here I will only deal with those methods with which I am familiar and with which I am using in practice. These come under the following headings:

- Yoga
- Respiration
- Massage
- Consciousness Training
- Autogene Training (A.T.)
- Progressive Relaxation (P.R.)

1. YOGA.

Firstly, I would like to make it clear how I work with Yoga. By exercising the mind and body without fantasy and with a 'both feet on the ground' approach.

In a yoga session of one hour, you are brought from a standing, working, human being to a laying, resting, relaxed, human being. This occurs by means of all kinds of exercises whilst standing, sitting and laying on the floor. The big comparison with gymnastics is that you work through these exercises in your own tempo, as far as your body allows at that moment. You must be very involved in what you are doing with utmost attention to concentration, with a consistent combination with respiration, in order to learn to feel the signals of your body in relation to the mind. At the end of every session there is a specific relaxation exercise which can be done in several ways. The methods A.T. (Schult) or P.R. (Jacobson) or a combination of both can be used. Yoga offers a nice combination of training the body in suppleness and the mind in concentration.

This can be summarized as follows:-

- Exercise - for body and mind.
- Respiration - awareness of and training of specific muscles.
- Balance - for body and mind.
- Total awareness of relationship between mind and body.
- Relaxation - to learn again how it feels to relax and be relaxed.

"Treatments - Methods to avoid"-J.Poyck
(relaxation-therapist).

References

- "Stress en Ontspanning" - Jane Madders.
- "Yoga Werkboek" - Jochum Dijkstra.
- "Energiek en ontspannen door Yoga" - Richard Hittleman.

2. RESPIRATION

The function may be clear to us all if we consider that we can live for weeks without food or liquids but we can live only about 5 minutes without oxygen. Perhaps it is for this reason that nature rules our respiration automatically. So if we take care of the muscular system responsible for respiration, then we are doing all we can and we are stimulating confidence in our respiration.

Stress is readily recognizable in our respiration and that can be a signal to do something about it or even to change our life-style. There is an interaction and by breathing in a certain way we can restore a balance in body and mind.

Much has been said on this subject but the following gives an overview:

"Ademen wij vanzelf" - Bram Balfoort en Jan van Dixhoorn.

3. MASSAGE

This is a treatment which is done to you without you doing anything yourself, so one can understand that this can be relaxing for many people who never actively do something for relaxation, thus massage can be a good treatment. It stimulates blood circulation in muscles in which stress has caused poor circulation. Stress in the mind can cause tension in certain muscle groups - in the neck, shoulders, lower back, etc...

Often people are unaware of causing high tension in muscles because they are unaware of the feeling and here, massage can help. Many people put up a shield to the outside world as a mental protection but in time, this leads to malfunction of several organs. A total massage of the back muscles for instance, gives a very reposing effect. One can discover how it feels to release tension in the muscles which removes the contraction signalled by the brain. This can be very important in recognis-

ing a build-up of stress and in its avoidance. Well anyway, it's always worth a try!

4. THINKING

Thinking is talking to yourself: So each person is his first fellow-man: let this fellow-man be your friend. I say this because I know that many people think very negatively about themselves. If you do not change this way of thinking, you will keep a lot of problems right there on the spot. Nothing will change - it will become static. First you must see the relationship between your mind and the way things go - or don't go. Stress in your thinking builds its own "prosters" or switch systems. When this happens, automatically there is a reaction outside the control of your will. So it can happen that you build-up an uncontrolled switchboard because of conditioning. For example, all those muscle stimuli needed to take a cigarette out of the packet, to light it and to smoke it. Mostly you do it automatically because of conditioning. Once the switchboard is complete only one signal in the right direction is needed to repeat the whole process over again. Habits are very obstinate and remain, if we do nothing about them. You always have to do something to make it dynamic again, then everything is possible.

If you only think about a problem, this only results in a waste of energy. We have to re-structure our thinking and we need help for this process, learning how to live with ourselves, our surroundings, our work, etc...

Everything is in a state of change so don't keep your thinking controlled by these "prosters" because there will come a time when they no longer fit. Then you will stand alone because you forgot to train your brain and you will have created the circumstances for generating STRESS.

References:

"Rationele Zelfanalyse" - Dr.R.F.W. Diekstra.

"Hersenwerk" - Leslie A. Hart.

"Gras Onder Mijn Voeten" - Paul de Roeck.

"Niet Morgen Maar Nu" - Wayne W. Dyer.
AUTOGENE TRAINING (A.T.) - Dr.SCHULTZ.

A way of learning to relax is by repeatedly telling yourself to relax,

with the help of certain sensations. For example : first sit in a chair and feel the natural rhythm of your respiration. Then repeat to yourself 6 times, "I feel warmth in my right hand". Then you continue with your arm, leg, foot, etc... The therapist can give these impulses to your thinking and you have to train your system, using the power of imagination, repeating the training daily. Visits to a therapist can be weekly but at home you must practise say 3 times daily for about 10 minutes.

References:

"Autogene training in de praktijk" - Dr. Günther Krapf.

"Gezond door A.T." - G. Eberlain.

"A.T. met jonge mensen" - G. Eberlain.

PROGRESSIVE RELAXATION (P.R.) - Dr. JÄCOBSON

This is an active way of relaxation by using muscles.

There are 3 phases:

1. Tighten - built-up tension in a muscle group by inhalation.
2. Keep it that way for a short while feeling the tension by holding the breath.
3. Exhale, relieve the tension and feel the difference.

If muscles are totally relaxed, the nerves do not contain any messages. As I have mentioned previously, tension in the mind is often translated into tension in the muscles in such a way that we are unaware of it. JÄcobson has said "it is possible to build up tension so it must be possible to relieve it".

Much has been said on this topic also but if you would really like to know more you have to do something. Find a therapist with whom you can work well. This is very important because there has to be a good relationship between you and another person involved in your good health.

For more information contact:

J.F.E.A. Poyck

Neerbeekerstraat 31,

6191 HK NEERBEEK.

Tel.: 04402 - 78927.

THE ANNUAL "STRESS" TEST

by Eurospero

Every year, on or about the birthday of Prince Charles of England, which only a few people know is on November 14th, I am required to leave my bed around 0530 UTC. Only a few people know that this means 'Universal Coordinated Time', formerly GMT which everybody knew and understand. So why the change? Perhaps we may expect other changes. Perhaps ICAO would like to implement the 'PAREE' Meridian. Now that a planned tunnel, linking Continental Europe to the mainland of Britain is foreseen for 1992, perhaps that would be an appropriate date for the change! But to get back to 0530Z...

After drinking double my normal quantity of breakfast tea, I drive to Maastricht via the motorway, joining thousands of other commuters in the peak traffic period which the Dutch call the "spitsuur". It's called this because drivers who regularly get caught up in these traffic jams, often tend to spit blood by the time they arrive at their place of work.

Now if by chance you should wish to drive from say, Barcelona to Maastricht, this you can do, via autopista, autoroute and autosnelweg without stopping, until you approach Maastricht, where a serious number of synchronised traffic lights are installed. It is almost as though the planners intended to discipline motorists who have been speeding along the splendid (illuminated) motorways of Belgium. "Now that you're in the oldest city of The Netherlands, cool it!". And this you have to do at a leisurely speed of 50 kms per hour.

So here I am, finally (road works permitting) reaching the correct side of the river, after having driven a bridge too far, at the Medical Examination Centre. By now it's 0810 L.A.T.E. (Local Anaesthetic Time) and I commence the usual nervous conversation with the nurse, hoping that the excess of tea will enable production of the required specimen. Now it's time to memorise the critical lower lines of the wall-chart, in preparation for the vision test. Having passed this, I am schocked to

discover that they have changed the audio test procedure. Now you must sit with your backside (continental phraseology) to the operator. No longer can you anticipate the inaudible tones in the headphones, by closely watching her hand movements on the volume control! Again a pass, but now the tension increases. It is time to remove any further clothing which might have kept a body warm and to be locked in a small room furnished only with a seat. This room offers approximately one square metre of floorspace without windows, where you sit awaiting release by the doctor who has not yet escaped from the 'spitsuur'.

But I must go back in time to the moment of arrival for the medical examination, when one is handed a form to complete, without which no administration can function. As the two hundred and ten questions are again answered, I feel a quickening to the pulse and a rise in blood pressure on reaching the question which asks if I take "the pill". Displaying considerable self-control, I resist the temptation of giving an incorrect response, as I have done for the last ten years!

Suddenly the door opens. My solitary confinement ends when the doctor asks me how I am feeling. I assure him that I am quite well and return the question. He says that he is never at his best in the early morning and waves me to the examining couch. For some inexplicable reason, I think of Lady Diana and birthday presents, until the knock-on-the-knee with the hammer brings me back from my rêverie. The doctor continues his exploration of parts that other professions cannot reach, accompanied by the special noises that doctors make to demonstrate their approval or disapproval of physical condition - "Hum"; "Ha-ha"; "Ok clear", "Tja!" etc... Finally, he smiles and says, "You can get dressed". This you do rapidly, because the

temperature has only reached about 17° C, which differs considerably from the 23° C of the Operations Room, where the recently installed sub-tropical plants seem to be more comfortable than my colleagues, whom I must now join.

Heading towards the previously mentioned 'autosnelweg', I discover that I have left something behind. I stop the car at the side of the road and jog back to collect it. Upon return, barely six minutes later, there are two blue uniforms taking note of my number plate; the tall thin one asks if I am the driver and the small female one smiles. Standard phraseology follows, including the words process-verval (PV) and parking offence (PO). I tell them my story of urgent medical business, safety of aircraft, working shifts - just like the Wonderful Dutch Police, etc... She continues to smile and I think perhaps I have overdone it a little. Then he hands me my fifty-guilder copy of the PV, we all smile, shake hands and go our separate ways. Now en-route to the ATC Centre, I find myself whistling a royal tune. Another exciting day in aviation has begun.



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FROM THE PRESS

Two stewardesses from an Icelandic airline, having a nice cup of coffee in the airport's restaurant at Reikjavik, were so excited by their own conversation, that they completely forgot their flight. The captain, thinking everybody was on board, started the engines and took off without the cabin crew. After being in the air for more than 40 minutes, a thirsty passenger knocked at the door of the cockpit. The painful truth then came out. The captain returned to pick up the unfortunate stewardesses...

"Het Nieuwsblad" February 4th, 1986.

TCAS EXPERIMENT

The French administration conducted an experiment similar to that of the Americans (see Input 85/II), to test the integration of TCAS within the European aeronautical environment, which differs from the U.S. in the mixture of IFR/VFR traffic.

The F.A.A. loaned a DALMO VICTOR TCAS to the DGAC, who installed it in an Air France B727.

The recorded tapes were sent to the MITRE Corporation (as in the U.S.A.) for read-out and the results analysed by the DGAC. Observers from various sources (pilots, controllers and engineers) gave their support for the project.

The TCAS reliability was average, a number of regular failures occurred which did not affect the functioning of the equipment. As far as the recording system is concerned, it proved defective, preventing the recording of important information on several occasions.

Results.

400 flights were conducted during this period, with observers aboard on 267 of them (67%), representing 322 flying hours. Data collected:

- 86 traffic info's, 1/3.7 hr. (U.S. 1/5 hr.);
- 7 indications of resolution 1/46 hr. (1/29).

Traffic Information.

Two-thirds of the infos occurred between ground level and 1000 feet (U.S. 60%),

50% with an altitude difference of between 500 and 1000 ft.

70% with over 1500 ft.

20% unknown altitude (a/c without mode C).

In 50% of cases the a/c was in level flight with auto-pilot engaged.

In most cases the conflicts occurred in VMC with visual contact of the conflicting traffic in 62% of these cases.

It should be noted that most of the time the conflicting traffic was seen by the observer before appearing on the TCAS. Only in one-third of the cases did the TCAS help to visualise the traffic. A.T.C. intervention concerned only 15% of cases actually seen.

Resolution of Conflicts.

Of seven resolutions, six were preceded by information. Visual contact was established with four out of seven conflicting a/c.

Twice an A.T.C. intervention occurred. As far as resolution instructions are concerned, four were preventive and two corrective. The last one was provoked by the pilot after approval from A.T.C. - an interception at an altitude of 5000 ft.

It should be noted that under this configuration, the conflicting traffic started descending after being so instructed by A.T.C. the avoidance manoeuvre suggested by the TCAS was also a descent.

Conclusions.

At this stage too few elements have been gathered on which base a valid opinion about the operational character of TCAS. It appears, however, that the results from both the French and U.S. administrations are very similar, despite the differing environments.

The opinion of the observers about the traffic information is generally favourable, although this information was often too little or too late.

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Landscape gardening -
laying - out and maintenance

arthur speetjens

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- Shrubs and climbing plants

EXTENSIVE ASSORTMENT:

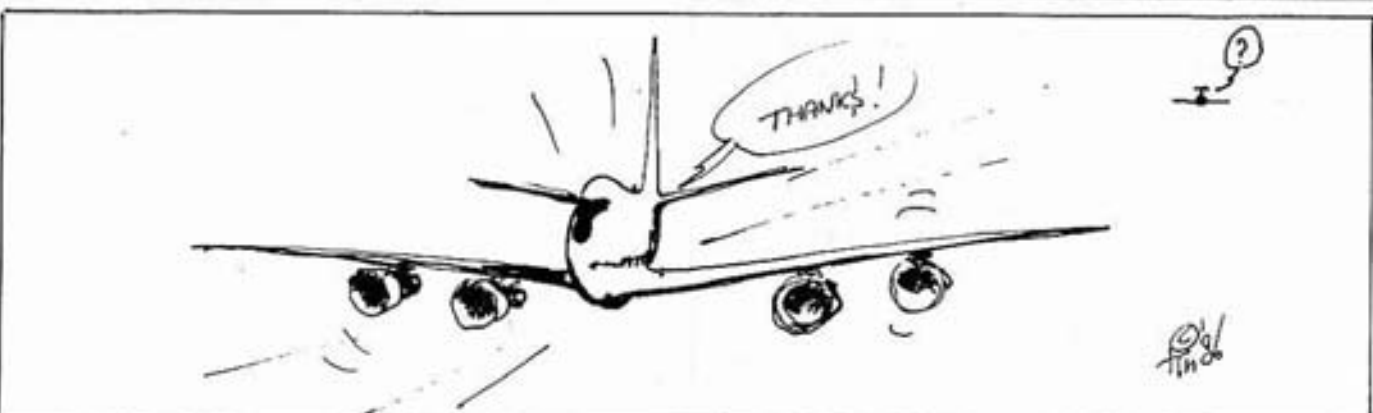
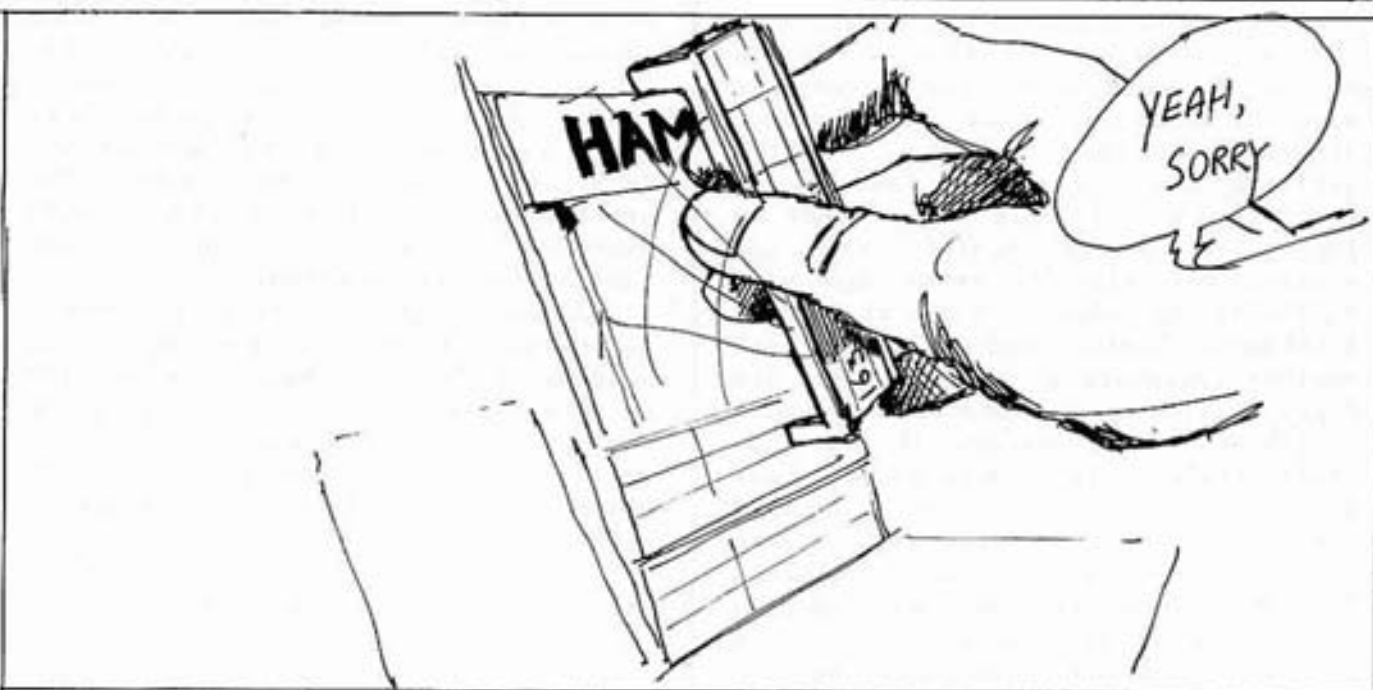
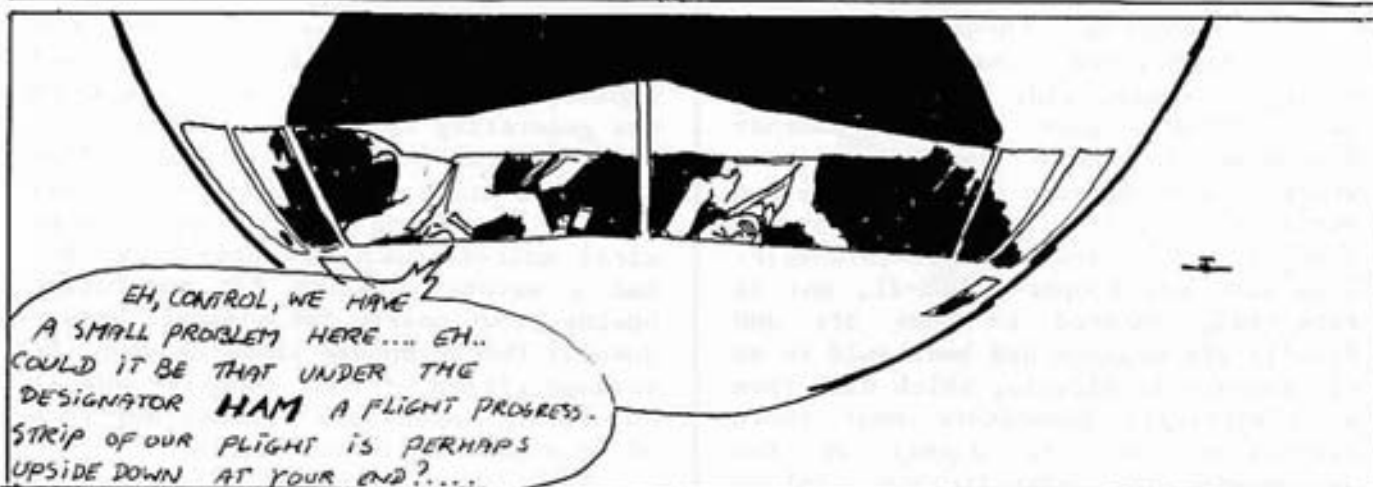
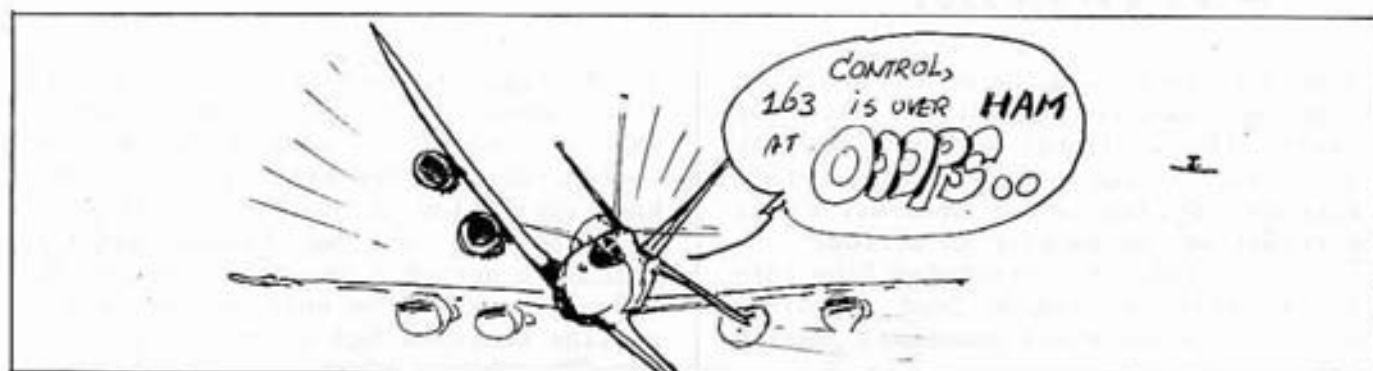
- SODS
- All types of heather
- Roses

LAYING-OUT OF TERRACES:

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



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"PALUDRINE"

by Philippe Domogala

Air operations in Africa are somewhat different from the day-to-day routine we sometimes experience with our "well off" airlines. Having seen the state of surface roads during certain seasons one begins to understand why aircraft are so popular in Africa.

They transport everything from cattle to milk, to frozen food, to hi-fi radios, pineapples and sometimes passengers.

The aeroplanes themselves are of various types, and recently the availability of cheap, old, first generation jet aircraft, gave suddenly another dimension to these small carriers, which used to operate curtiss C-46s and DC-3s. This particular airline operated 2 DC-3s, 1 DC-4 and a single Caravelle. They also had bought a DC8-21, but it repeatedly refused to take off and finally its engines had been sold to an oil company in Nigeria, which used them as electricity generators near their oil-fields, to the dismay of the neighbours. The Caravelle was used to link the 2 North provincial cities with the capital of this particular African State. A 40 minutes' flight compared with an 8 to 12 hours bus journey, assured constant revenue. Before arriving in Africa a few months earlier, the Caravelle had already an impressive career behind her: she started her life 25 years ago with ALITALIA, then changed hands at regular intervals, having been used by such various operators as the Columbian Air Force, a Venezuelan Meat-Hauler and a Caribbean cargo company. If the aircraft outside paint scheme was slightly appealing, the state of the seats and the inside cabin in general was even worse. The Caravelle was nicknamed "PALUDRINE" (her real name was "Empress Ushiba") after the antimalaria tablets that many Europeans in Africa swallow everyday. The name was given to her because of the tremendous smell that was permanently inside the aircraft, a smell that was supposed to keep away the mosquitoes, therefore preventing malaria in the same efficient way as the quinine-based pills. The smell was self generating, since because of its presence, more people were getting sick on board and since there were no sick-bags in the aircraft, nothing was lost.

This Caravelle was filled with a 99 seat configuration. The pilots operating here were incredible people. Their

pilots were of such mixed nationalities as Portuguese, French, American and even Cuban. The only flight engineer was an ex-chief sargent from the Central-African Republic Air Force and knew everything about the aircraft. He had operated and maintained Emperor Bokassa's personal Caravelle for years, and was in fact the only person in the airline who knew how to read technical manuals. He was always wearing a white overall, which was a gift from the nurses of the local mission, and because of it, and of the respect he was generating around him, he was nicknamed "Doctor". The rest of the airline personnel were mostly middle-class ... who had a profound disinterest in technical matters such as aeroplanes, but had a natural feeling for generating business. Of course the constant breakdown of the telephone lines between the various cities of that country made it absolutely impossible to make any form of reservation on the flights.

The initial rule was a "first-come, first-served" basis, but the local corruption and the family and tribal links of the airport clerks somewhat upset the scheme, to the point where small riots were not uncommon on the departure section of the tarmac. The problem was even worse on Fridays, with everybody wanting to return to the capital for the week-end.

On one particular Friday afternoon, there were around 150 passengers all holding an "OK" on their tickets, 120 of whom had already managed to get, one way or another, a boarding pass, all waiting for a 99 seat aeroplane. "PALUDRINE" finally arrived, and suddenly a mass of passengers rushed to the tail of the aircraft, before the engines were even shut down. The stairs deployed an an impressive stewardess, Aeroflot style, but black, started shouting in Bambara (the local language) to the crowd probably exort the would-be passengers to let the incoming pax disembark. Finally she was successful, only to find out that the front door of the aircraft was open and that at least 50 passengers had already boarded via this "exit".

Before she could do anything all 120 passengers were on board starting to fight for seats. The captain, a Texan who was an ex Korea, ex Biafra Air Force mercenary and a lot more, got out of his cockpit and shouted: "All

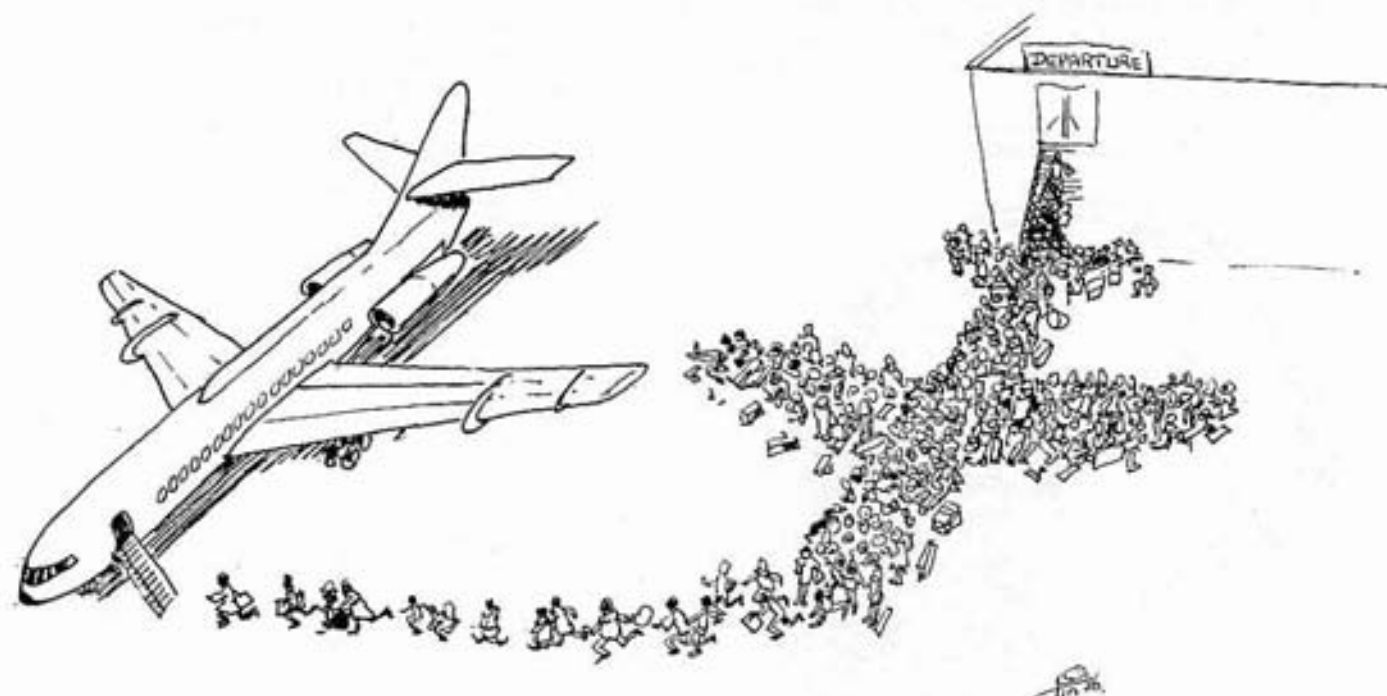
Right! All Right! Close the doors...!" Then he ordered all arm-rests on the seats to be lifted-up and started seating 3 persons on 2 seat sections. When one or two passengers dared to ask about seat belts, they were told that if they wanted personal seat belts they could always wait for the next plane on Monday. The reply successfully prevented any more complaints. 3 Passengers still could not find a place, so were seated between the rows of seats, with the recommendation to hold the seat's legs beside them during take-off and landing. The cockpit was also full, since the station manager and his secretary were closing the local office for the week-end and were travelling as well. The secretary had the jump seat and the station manager sat on the pilot's briefcase. The take-off went without problems and if it was not for a bit of turbulence producing exotic noises and more smells from the cabin, it would have been an uneventful flight. The landing, however, was not without some minor problems.

On that particular African airport, the runway is cut in two by rails from a railway track, serving the airport fuel tanks from the local Harbour. The landing always produced the traditional "Tong-Tong" and a slight jump from your seat as the aircraft was crossing the tracks. But today, with the aircraft

load and the approach speed being a bit on the high side, the traditional "tong-tong" became a single loud "TONG"!! followed by a tremendous jump, then the aircraft touched down again and braked immediately as it was rapidly approaching the end of the runway.

This caused a lot of passengers to fall off their seats whilst being bombed with briefcases and bits and pieces falling from the overhead lockers. The 3 passengers in the aisle were sliding gently towards the now open cockpit door. The aircraft finally stopped, and as if nothing had happened, immediately made a 180° and started to backtrack the runway. The passengers were shouting and arguing about their property all standing-up and walking on each other, unaware of the Aeroflot-type stewardess shouting "Remain seated!" from the back of the aircraft.

When "PALUDRINE" finally arrived in front of the terminal, the stairs were lowered and a mass of suddenly dignified passengers went out in near perfect order, all smiling and saying "Thank You!" to the Aeroflot-type stewardess standing at the doorway, as they walked away. The captain went to the bar to file his A.L.B. (= after landing beer) and was heard talking to the airport manager: "You should do something about those runway tracks Man, they give a bad impression of your country to the foreigners you know...".



WHAT HAPPENS IN THE HEAD OF THE CONTROLLER?

"The brain is as unexplored as the African continent at the end of the last century". Barbet-Schroeder-More.

It is true to say that Air Traffic Control uses highly sophisticated technology-computers, telecoms, radars, etc... - but to analyse the global situation of air traffic and divide it into four phases viz. the primary analysis of the flight plan, the spatial position of the aircraft, the detection of a potential conflict and its resolution, is a process which requires equally sophisticated brain activity. The air traffic controller, as we shall see, is as a human being utilising the brain's capacity to its maximum.

Important Cerebral Event.

Let us for a moment consider when the controller is integrating a new aircraft into those already in his charge.

The first analysis is linear, calling on long term memory: aircraft type, reading of beacons along the a/c's route, flight level and times overhead. In a word to decorticate (look it up!) the newcomer. This activity is regulated by the "Occipital" lobes of the brain (visual information) and the "Parietal" lobes (reading).

When the new aircraft is actually in contact, the "Temporal" lobes (aural information and liaison between aural and visual stimuli) come into use.

In these cases predominance of the left hemisphere is very clear (see diagram).

by Patrice Leclerc (French ATCO))

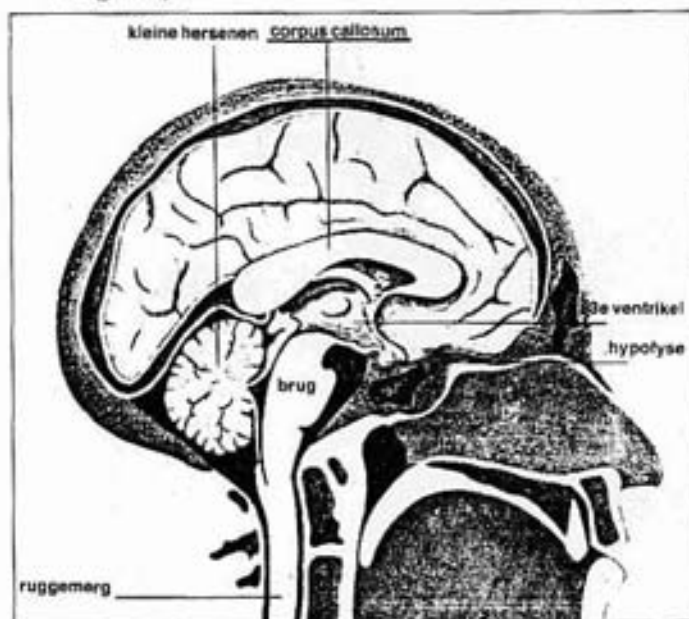
Then follows spatial representation: recognising the aircraft route, altitude, and its climb/descent profile. The primary information from the above then assumes a completely different meaning. The parietal lobes - which also control three-dimensional representation - and the occipital lobes, are again in use, but now predominance passes to the right hemisphere. All information has been transferred to the corpus callosum, and infiltrated into the other hemisphere. A very important cerebral event has occurred, whose nature is difficult to properly realise.

The Finality of Work.

We now reach the phase of conflict detection: aircraft trajectories are converging, the flight levels are equal, aircraft are catching each other up. The controller must take positive action. The short-term memory is required. The faculty of extrapolating an event, and to feel oneself implied in it, is contained in the frontal lobes. The right hemisphere is again predominant at this stage.

Now we come to the finality of work - solve the conflicts between aircraft. The controller must find and apply at least one solution, and if several are possible, choose the best one considering the total air traffic. All this activity of research and choice of solution takes place in the frontal and parietal lobes. However, and this is where such work is important, the controller must also be ready to express himself in clear and concise language. But the language faculty is again the work of the parietal lobe, in the left hemisphere (the right hemisphere is hardly able to express itself). A new transfer then occurs through the corpus callosum, the time from the right to the left hemisphere. Note that this process only takes a few seconds.

So for each pure control problem, the controller has to live with fast use of all parts of the cortex, and two transfers between the cerebral hemispheres. Additionally, the solution of the problem must have no effect on the overall air traffic. Obviously one does not separate two aircraft by turning one of them toward a third. If, however, it is not possible to act



otherwise, then it will be necessary to turn the third aircraft and so on. The frame of representation of aircraft movements must be perfect and coherent, should one link fail it may all collapse. A controller often states that one airmiss might be "hiding" another; he has an average of twelve aircraft simultaneously under his control.

The Difficulty of the Controller's Profession.

To return to interaction between the lobes and inter-hemispheric transfers, it is obvious that a large number of neurons and micro-circuits are in use. When a controller is working, all his cerebral potential is in action, and he has learned to act quickly. When he solves a conflict, in order to send a clear and coherent message to the pilot - in order to speak - he has again to use information stored in the right hemisphere, and this is the greatest difficulty of the profession of controller, not only must he be aware of problems, but he must also verbally express them.

One will easily realise that the formation of a controller takes years, because these faculties have never been printed in our genes - there is no "A.T.C. chromosome" in the genetic heritage of *Homo Habilis*.

Clear also are the difficulties facing instructors in forming a new controller. How, by means of language, influence and structure the hemisphere of the student, who does not fully understand this language?

The task of the instructor could be summarized as communication between his and the student's left hemisphere, firstly at the beginning of the integration phase of the aircraft (call-sign, type speed) and secondly at the end of this phase (comparison of the instructor's and student's solutions). The influence of the instructor over the student's right hemisphere can be effected by means of gestures, diagrams, etc... but it is basic and will remain so. The student's work, structuring of the right hemisphere, agility and rapidity of the corpus callosum are all essentially personal.

As an analogy one could say that the controller must teach the pilot to ride a bicycle by quoting a book, he must quickly describe to the pilot how to move his legs and body using only speech - without a single gesture. It goes without saying that the intelli-

gence quotient increases strongly during the formation phase.

Sixth-sense, Reactions, A.T.C. Lobe, or True Art?

Controllers have different ways of describing their abilities. For example some experienced controllers speak of a "sixth-sense". It is obvious that this remains only theory, but could explain the feeling of when both hemispheres are in agreement on the resolution of conflicts. In fact the synchronous and balanced activity of the two cerebral hemispheres produces a pleasant sensation.

On the other hand, the rapidity of execution leads some controllers to believe that A.T.C. gradually becomes a natural or reflex reaction. In a potential conflict situation the heart-rate frequently rises to 140 ppm, to enable the body to fuel the brain with extra blood and oxygen, and is of course a purely natural reaction. But the controller's activity remains conscious because only the cortex is in use.

Of particular importance is the fact that the assimilation of the A.T.C. function has nothing to do with "conditioning" of the brain, even less with "brain-washing", rather the reverse is true. Finally, the language has never been defined as a reflex activity.

Some controllers speak of an A.T.C. lobe within the brain.

A certain number of neurons are used in the learning process, which also regulates the nervous influx. When a controller does not control for six months or so, certain neuron links will disappear due to age and decay of nerve cells, and he will experience difficulty in taking up his work again. This accords with the fact that age plays a role in the ability to learn, and to execute decisions; the older a controller, the more he tends to rely on his experience.

Some would have us believe that men make better controllers than women. This is ridiculous, the human brain is the same for all mankind.

Are there controllers who don't dream about their work? Occasionally, especially during training a controller will dream about A.T.C. problems. During dream activity normally only the right hemisphere of the brain is active, the left sleeps; which would seem to explain why during training - although this involves the development

of connections between neurons of the right hemisphere to evaluate problems - generally during his dreams he is unsuccessful in solving these problems. Proof that the left hemisphere of the brain is indispensable to the completion of tasks, even though the right is conscious of problems.

Leaving aside the factor of rapidity of execution, the only human activities close to A.T.C. as far as intensive use of the corpus callosum (transfer of information between the hemispheres of the brain), and clear verbal expression (Scoop stop laughing!) are the artistic activities. We could therefore speak of an "Art of Control".

Sophistication of Social Work.

If one considers human evolution, it must be observed that an Air Traffic Controller uses only the most recently developed attributes of the human brain: the cerebral cortex, the frontal lobes and the corpus callosum. It would seem that the latter is the latest and most important phase of cerebral evolution; it regulates balanced cerebral activity.

The frontal lobes of the brain are a product of civilisation, one finds here the concept of death, and the famous "I think, therefore I am". One also finds here the will to exist independently of the environment, to be able to act over it and to extrapolate the future from acquired knowledge and experience.

A.T.C. is precisely that - foresee and act - and can therefore be said to be the result of human biological capabilities, to the service of society, created at good purpose of itself.

The phenomenon is peculiar to our level of civilisation. In no preceding one has the human being exercised to the full the most recently acquired faculties, at the expense of the more primitive faculties of survival - running, agility, etc... The only muscular efforts required of a controller are to stay seated, exert a slight pressure on the transmitter switch, and to wear a few grammes of plastic.

In brief then - A.T.C. is the most advanced expression of the sophistication of social work.

(Someone get Scoop up off the floor!).

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CERTIFICATION FACING THE FUTURE OF AIR TRANSPORTATION

Little is known about the point of view of the authorities in respect of the next generation of aircraft. Evolution or revolution? How do authorities play their rôle in this matter? In practice by a number of certification requirements, such as:

- FARs, i.e. Federal Aviation Regulations of USA;
- JARs, i.e. Joint Airworthiness Requirements;
- matching new technologies;
- matching new operations;
- and by certification procedures, aiming at
- facing increased international development;
- import, export.

How authorities play ... and close the loop can be illustrated in an air transportation system like this

Existing codes of airworthiness.

- FARs (Federal Aviation Regulations of USA) are
 - based on very large experience;
 - covering all types (transport category, small helicopters, etc...);
 - to fit US needs (safety, economy, legal);
 - developed in a US rôle-making procedure.
- JARs (Joint Airworthiness Requirements) are
 - developed since 1971 jointly by ten authorities;
 - through an "ad hoc" procedure with high involvement of AECMA;
 - to fit European needs such as facilitating import/export, facing joint projects, exceptional need for national variants;
 - based as far as practicable on existing codes.

There are a number of available JARs, such as

- JAR 25 for large aeroplanes based on FAR 25 of USA;
- JAR E for engines and JAR P for propellers, based on UK BCAR;
- JAR APU for auxiliary power units, based on US TSO;
- JAR TSO for various equipments;
- JAR 22 for sailplanes and powered sailplanes complemented by JAR 1, definitions and abbreviations and "green covered documents" for procedures.

All these codes are composed of, or associated with

- a code giving as far as practicable objectives rather than specific ways to design, with, however, arbitrary limits where experience shows it to be necessary;
- published interpretative material

and acceptable means of compliance offering design flexibility;

- a procedure to develop "Special Conditions" to cope with unusual features ("the next generation of aircraft", example of A320).

The future of air transportation is not only new design but also new operations (examples: helicopters, Cat. II and III). These new operations need be taken into account in type certification requirements. In addition there is a constant need to develop a reciprocal flow of information between designers and operators (a need stressed by sad experience, e.g. Chicago DC10), i.e. as a regulatory procedure:

- maintenance review board;
- flight operations evaluation board;
- flight standardisation board, or for extended overwater operation,
- reliability tracking board.

How do all these requirements in products apply in respect of certification procedures to face industry's challenge?

On the one hand there is the international development (Concorde, A300, B767, A320 and engines CFM56, V2500) on which principles and concepts and flexibility are applicable. On the other hand the import/export to be regulated by bi/multilateral agreements.

Conclusion:

Evolution or Revolution? and the authorities declare:

Continuous evolution to match the needs for safety facing the future as it will be, whether it turns to be an evolution or a revolution.

(These data have been presented by C. Frantzen,

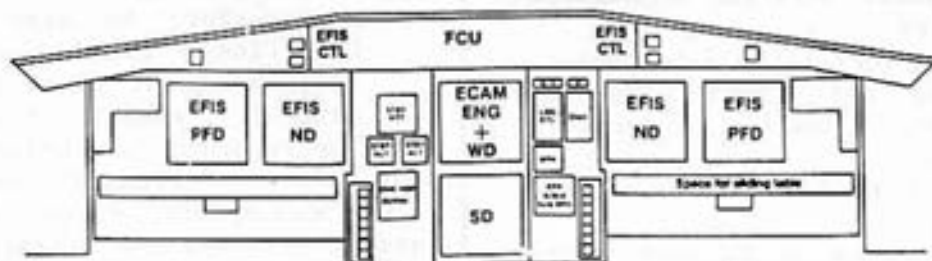
Sous Directeur du Contrôle Technique, Direction Générale de l'Aviation Civile at the symposium "Evolution or Revolution", Delft, University of Technology).

THE CAPTAIN WILL BECOME FLIGHT MANAGER

An area in which considerable progress has been made in recent years is that of the flight deck displays. There is the changing pattern of the pilot, to a rôle of flight management and monitoring.

To start with Airbus Industry; they have made a major contribution in two areas. Their A310/A300-600 Primary Flight Display (PFD) is a lot more than just a colour TV-picture. Pilots having flown either of these aircraft seem to

flight deck-main panel



be enthusiastic about its presentation and quality. The second major step forward is in the presentation of synoptic systems diagrams on their Electronic Centralized Aircraft Monitor (ECAM)-system, together with clear and concise procedures to be followed in failure cases. The CRT exploits a tremendous potential as a means of conveying information. An encouragement to go even further on the A320 by presenting altitude, vertical speed and heading data on the PFD (see picture below) and adding primary engine indications on the ECAM-display.

For airlines, the following operational criteria are at issue:

- number of crew
- CRT-displays
- FMS (Flight Management Systems)
- noise level.

The airlines like aircraft operated at low noise and by a two-man-crew. The new digital system is changing the pilot's task even more towards flight management and monitoring as previously mentioned.

Let us take the Fokker design which they call The World's Most Advanced Cockpit, in this case the F100. The new Fokker 100 airliner will be equipped with an advanced cockpit when it enters airline service in the spring of 1987. Equipped with CRT displays and computers that will monitor flight position, navigation, flight control and automatic landing, the new airliner's flight deck will bear little resemblance to those of jet aircraft currently operating short-medium haul routes. The two-man crew will work in an environment very similar to that of the space shuttle control compartment and the captain will become a flight manager.

The almost complete replacement of the electro-mechanical instruments of earlier generation passenger aircraft by displays and computers is an evolutionary development.

Information received by the crew will not be greater than before but

will be more concisely and more clearly presented, with the result that paperwork such as flight manuals will disappear. Flight information such as speed, altitude, vertical speed, angle of descent and flight path deviations is presented on the pilot's primary display. The navigation display generates information on flight plan, flight direction, distance to beacons, weather radar, wind and similar data. A third screen displays engine information and has several warning functions. Although the chance of display failure is rated no higher than one in 10 billion flying hours, some traditional electro-mechanical flight instruments have been added as a safety measure.

The adoption of computers in the Fokker 100 cockpit is primarily dictated by the density of current flight traffic, especially in Western Europe, and by the need to fly ever more economically and efficiently. The advanced cockpit will also inform the crew of the shortest and most favourable flight routes and so enable them to achieve, in consultation with air traffic control, substantial time and fuel savings on short-medium haul sectors.

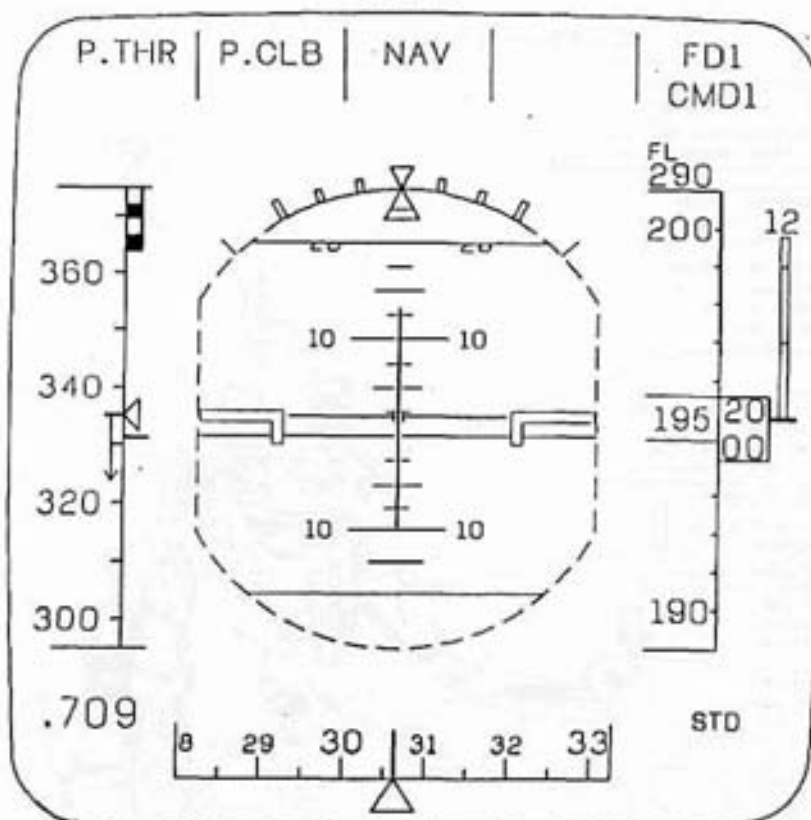
On airfields equipped with suitable instruments, the F100 is also capable of fully automatic landings in Cat. III conditions. In these operations the autopilot is connected to the flight computer, enabling the aircraft to land under completely automatic control in very heavy weather and severely restricted visual conditions.

Modern electronic facilities are employed to ensure that any system or instrument malfunction shall be presented to the crew only if it requires action on their part; they are thus enabled to concentrate undisturbed on the correct priorities. The number of aural warning signals currently in use on airliner flight decks will be halved.

As flight manager the captain, by means of push buttons, gives commands to the automatic flight management sys-

A320 E.I.S

PFD



tem which, among other functions, calculates navigational data and flies the aircraft in the most efficient possible way. In turn, the flight computer commands the flight control computers which fly the aircraft, regulate engine power and undertake other responsibilities.

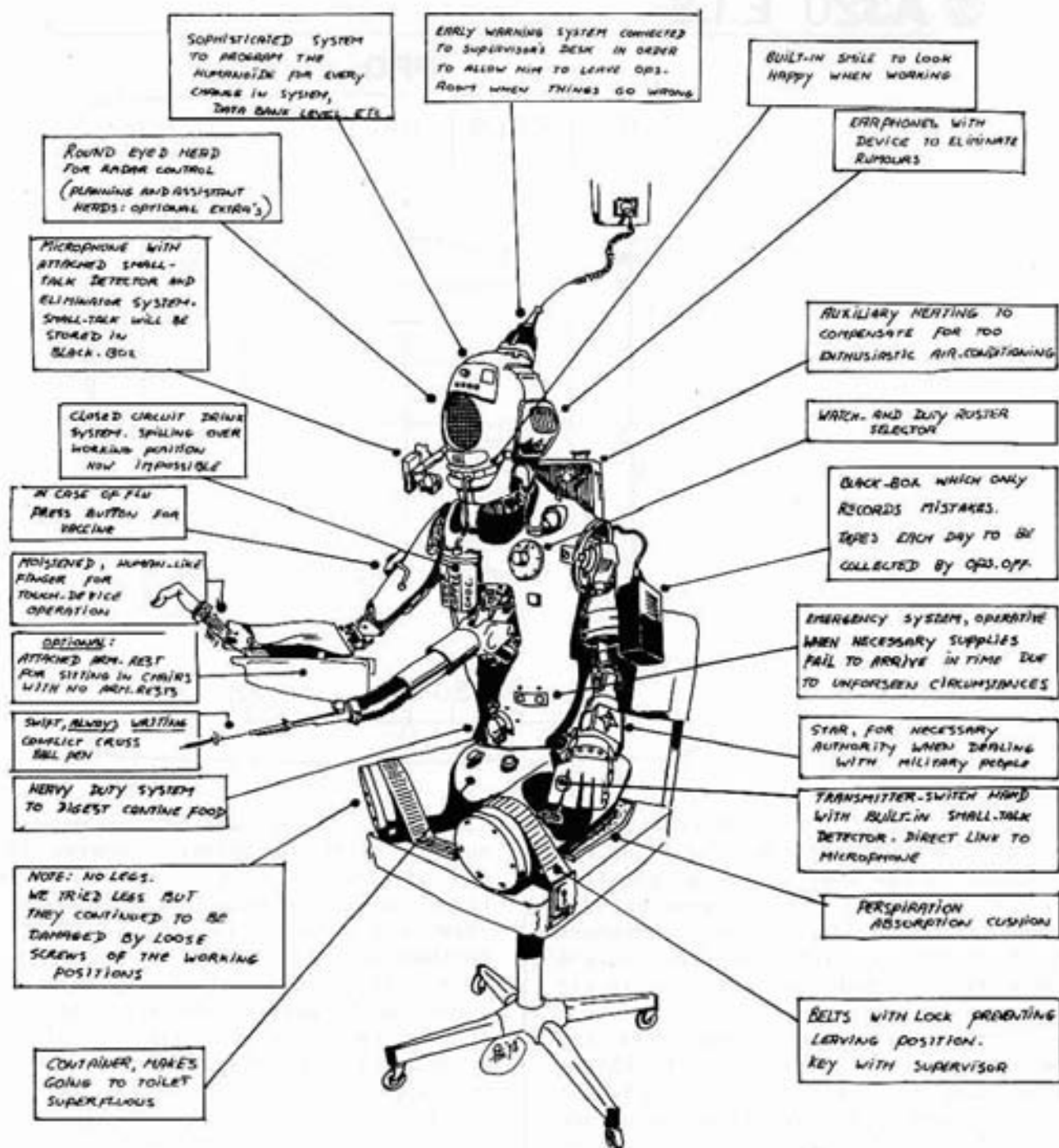
The pilot has only to press the buttons or turn keys to have the flight management and control system implement desired changes in direction, speed and altitude. In the same way he can give an order for automatic climb or descent.

Various other commands, covering for example desired rate of climb or cruising speed can be introduced into the computers' memory before the start of a flight. The flight computers then automatically control variations in required engine power. The system will not obey incorrect orders from the crew which would endanger the aircraft. If, for example, they were to request an angle of descent that would overpower the engines, the computer would automatically reduce the angle of descent to prevent the aircraft from stalling or the engine limits from being exceeded.

The question remains, do we still need a pilot in future? Knowing that the airlines aim at a two-man crew, there are even voices to reduce the crew to 1 person, this in the light of further automation. His new name could very well be Assistant Manager. On the other hand, pilots are well aware of the extremely low workload. But all the advanced improvements require a rational approach, as seen from the aircraft.

A big step forward is the map information giving the pilot the opportunity to detect his position at any moment.





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

Speech from Mrs. N. Smit-Kroes, Transport Minister of the Netherlands at Maastricht on March the 5th 1986

For a number of years now, one of my objectives - and as a Minister I have many - has been, that there should be no doubt as to the commitment of The Netherlands to the EUROCONTROL Organisation.

Measured against this objective I consider today's event as proof of success and as a first step towards full implementation of Concept I. The Netherlands upper sector has been transferred to this Centre and the short period between the decision to implement and today is the living proof that a constructive cooperation between the general directorate and the Netherlands administration has indeed been established. That in itself is reason enough for a festive mood, all the more so because in the past years, we have faced many obstacles, partly because National Administrations working together in a supranational project have to adapt their own objectives, sometimes even drastic in order to meet the challenges of cooperation.

The Netherlands upper sector has been transferred and its functions. The continued existence of the Maastricht Centre is safeguarded, so that it can play its role in Air Traffic Control and forms a practical and tangible exponent for the benefit of the whole organisation.

The saying that every coin has two sides is also valid today. We will be asked what benefits Air Traffic will draw from the institution of a Dutch upper sector.

It must be recognized that long term, far reaching political objectives often do not have an immediate visible positive effect. Our objectives, however, are well worded in the amended Convention of EUROCONTROL which came into force on the first of January of this year.

As said, this is an important step, but certainly not the end of the line. An even better use of EUROCONTROL in the area served will require an even intensified effort of all administrations concerned.

The transfer of The Netherlands upper sector has not been the only achievement last year. As you know my colleagues and myself have decided to develop an integration concept for the airspace of the Benelux and Northern Germany and between the civil and military centres serving that airspace.

I am pleased to hear that intensive discussions are taking place and my colleagues and I will soon have an opportunity to proceed to the next stage. That stage will not any longer, I trust, consist of another study of what could be done but of the implementation of what will be agreed and can be done. Specific projects will form the backbone of the integration process and I assure you that I will do anything that is within my power to stimulate the necessary process of further European integration and cooperation, also on issues as joined evaluation of national investments.

It is gratifying to note that a change in the atmosphere has taken place; ever so slowly the sense of competition which too often ruled the discussions on the future, is changing into a sense of cooperation.

If this tendency can be maintained and fostered into maturity, I have every confidence in the future of Air Traffic and Air Traffic Control in the area that this Centre also serves and indeed for the future of the whole Organisation of EUROCONTROL and for the future of Beek.