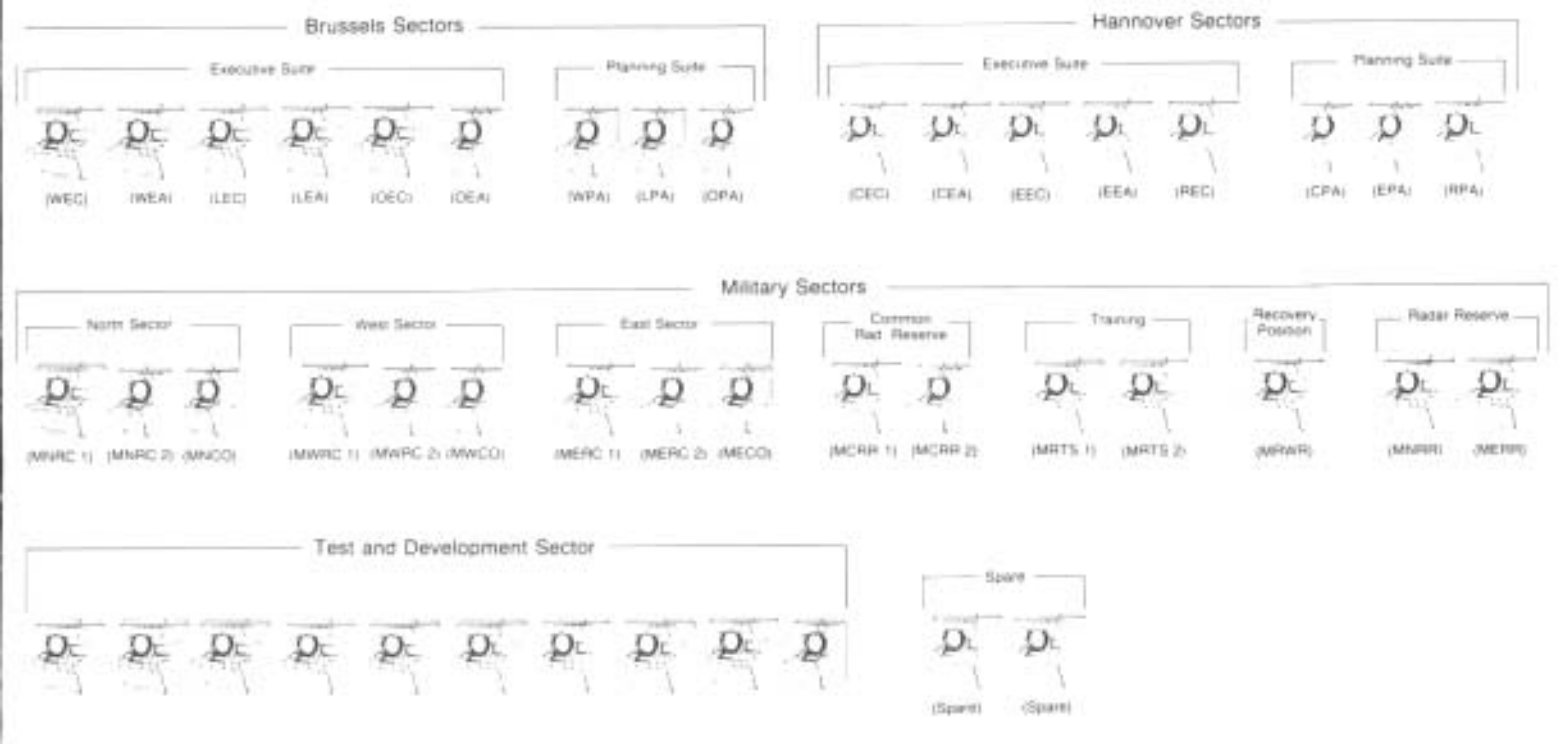

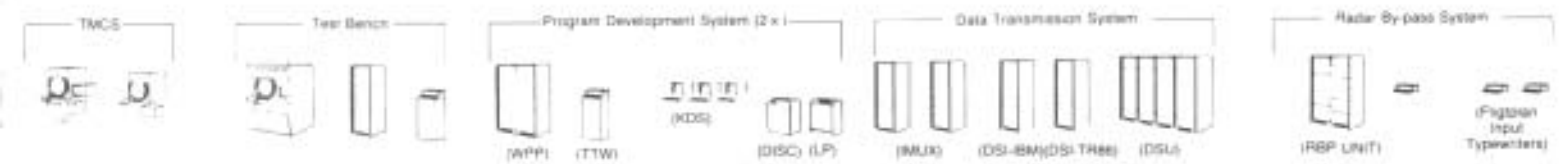

INPUT 1983-III

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EUROCONTROL GUILD of AIR TRAFFIC SERVICES

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Editor:
Rob Bootsma
Catharinastraat 29
6102 CX Echt
The Netherlands
Tel: 04754 - 5703

Artwork:
Martin Germans

Address:
INPUT
Postbox 47
6190 AA Beek-L.
The Netherlands

Bank: AMRO, Beek
Account: 46.86.12.254

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In Memoriam

Richard C. W. Weston

It was with deep regret that I learned of the tragic death of Richard Weston which occurred suddenly in Washington, U.S.A. on the 8th of August.

As a British lawyer, experienced private pilot, member of the Flight Safety Foundation and more recently an Aviation Consultant, Richard Weston was well known in ATC circles as a worthy advisor to and good friend of the International Federation of Air Traffic Controllers' Associations.

I had the privilege and pleasure of meeting him and working briefly with him at the special IFATCA Conference held in Amsterdam in August 1981, as a result of the dispute between the FAA and PATCO. One could not fail to be impressed by his friendly manner and in-depth knowledge of aviation matters. His advice and expertise in the legal field will be sorely missed.

But above all, he will be best remembered for his involvement in the fight for justice and fair play, for both relatives and victims of the Zagreb mid-air collision and for Gradimir Tasic and his controller colleagues. His book "Zagreb One Four", written in collaboration with Ronald Hurst, carries a dedication to the 176 persons who lost their lives on the 10th September 1976 and... "to Gradimir Tasic, Air Traffic Controller who also became a victim".

Richard Weston was also an Honorary member of the U.K.Guild of Air Traffic Controllers and of the Canadian Air Traffic Controllers' Association. His untimely death is a sad loss to the aviation world. For his interest and profound contribution to our profession he will long be remembered.

Our sincere condolences go to his wife Helen and his family at this time of bereavement.

Geoff L.Gillett
Maastricht - September 1983

Korean Airlines Flight 007
An Air Traffic Controller Comments

The shooting down of the Korean Airlines Flight 007 and the resulting loss of life of 269 persons must be condemned as an outrageous act. The full facts of the incident will never be known but the prevention of a recurrence of such a disaster should be firmly established as the first priority. An examination of available material leads to the conclusion that there may also be a risk within the European airspace.

If either by navigation error or by intent, a civil aircraft should violate the airspace of a particular State, there are Recommended Practices for dealing with such occurrences. It must also be realised that there might be circumstances arising whereby Air Traffic Control could be instrumental in bringing about inadvertently an airspace violation.

In areas of non-military interest, errors when detected by Pilots or Controllers are corrected and the consequences need not be considered within the context under examination. However, in security sensitive areas the effect of an unidentified intruder usually results in a rapid reaction, taking the form of an interception by military aircraft, invariably armed with a destructive capability!

The International Civil Aviation Organisation provides detailed Special Recommendations (ICAO International Standards and Recommended Practices, Rules of the Air, Annex 2, Attachment A) which Contracting States are urged to implement. These recommendations specify, inter alia, that "Interception should be limited to determining the identity of the aircraft and providing any navigational guidance necessary for the safe conduct of the flight". In Annex 6, Part 1, Chapter 7.1.2 it states that radio communications equipment shall provide for communication on the aeronautical emergency frequency 121.5 MHz. It is also a requirement that Company Operations Manuals contain details of visual signals for use by intercepting and intercepted aircraft, as contained in Annex 2 (Annex 6, Part 1, Chapter 11.1q). Referring back to the Attachment A of Annex 2, paragraph 5.1 states that the intercepting aircraft should, if equipped with VHF radiotelephony, attempt to establish two-way communication with the intercepted aircraft in a common language on 121.5 MHz. Paragraph 7.1 reads as follows: "INTERCEPTING AIRCRAFT SHOULD REFRAIN FROM THE USE OF WEAPONS IN ALL CASES OF INTERCEPTION OF CIVIL AIRCRAFT".

Finally, this Attachment concludes by stating that close coordination be maintained between an intercept control unit and the appropriate Air Traffic Services Unit during all phases of an interception of an aircraft which is, or is believed to be, a civil aircraft. Signals to be used in an interception are listed in Appendix A, paragraph 2 of Annex 2 and it is worthwile to note that an intercepted aircraft, if transponder equipped, shall select A7700 (Annex 2, Chapter 3.8d).

The International Federation of Air Traffic Controllers' Associations (IFATCA) has by means of Press Releases drawn attention to the need for the establishment of procedures of instant communication and exchange of information which would prevent the recurrence of loss of civilian life. It is clear from the foregoing extracts from ICAO documents that the basic framework of such procedures already exists. The vital missing link in the Korean 747 incident was either

the willingness to implement the recommendations or the inability to identify the Korean Airlines Flight 007 as a civil airliner.

It may not be assumed that such hazards are confined to the relatively more remote parts of the world. An examination of the Department of Defence Charts for High Altitude Flight Information carries the ominous warning - "Aircraft Infringing Upon Non-Free Flying Territory May Be Fired Upon Without Warning". A second warning draws attention to unlisted radio emissions that may constitute a navigation hazard or result in a border overflight. The border shown on this chart is that of the German Democratic Republic which at one point is only 4 NM from a busy civil route (UG5). Can this continue to be an acceptable risk for civil air travellers going about their peaceful pursuits of business or pleasure in the busy European skies of today and in the future?

As might be expected, there has been a worldwide expression of revulsion as a result of the unnecesssary loss of life in this tragic event. Various forms of boycott, demonstration, resolution and punitive action particularly against the USSR Airline, Aeroflot have taken place. But punitive action will not remove the hazard prevailing for civil airline passengers.

Air traffic controllers have an obligation for an involvement, via the various National and International Organisations, to add their voice of condemnation and their constructive comment, since theirs is the profession dedicated to the provision of safety for air navigation. Not to react at all would be an admission of a lack of professional conscience and a failure to demonstrate a personal concern. It may be argued that their voice is too small to be heard or to be effective. But it should not be overlooked that IFATCA has Member Associations in more than 60 countries of the world (including Japan), representation in ICAO and working relationships with Pilot Associations. Collectively, this amounts to a considerable amount of expertise responsible for the provision of safe passage on the ground and in the air, for the aircraft entrusted to their care. Until the recommendations of ICAO become internationally implemented procedures, by both Civil and Military Authorities an unnecessary hazard for civil air traffic will remain.

RESOLUTION.

Having been informed of the circumstances which led to the destruction of the Korean Airlines Flight 007 on 31st August, 1983 and the consequential loss of life of 269 souls on board that flight;

taking into account the disregard of established International Standards and Recommended Practices laid down by the International Civil Aviation Organisation;

being aware of the risk inherent in an inadvertent deviation from prescribed Air Traffic Services Routes;

the Eurocontrol Guild of Air Traffic Services urges the International Federation of Air Traffic Controllers' Associations to draw attention to the need for worldwide implementation of the ICAO procedures, in order to prevent a recurrence of this horrendous disaster and expresses condolences to those who have suffered the loss of relatives and friends in this tragic event.

MAASTRICHT - THE NETHERLANDS
SEPTEMBER 1983

The Warsaw Air Traffic Control Centre

by Philippe Domogala

At the other side of the international airport of Warsaw the air traffic control centre is accommodated in a small building beneath the tower. Some 40 civil controllers are working here.

The Thomson-CSF equipment is quite modern and provides the controller with labels, SSR-code, Mode C information and speed indication on synthetic displays. Secondary and primary responses are superimposed, and code-callsign correlation is effected via a keyboard underneath the scope.

Warsaw tower in control of a LOT IL62 taking off.

The secondary surveillance radar has a range of about 500 km, so that almost the whole territory of Poland is covered by SSR. The SSR antenna is mounted on top of the approach radar antenna (range 100 km), which has a faster rotation rate; as a result definition at long range is not optimum. This and the lack of SSR procedures means that separation of traffic has to be effected in a procedural way. The large scope between the two sectors is only used as an aid, not as a tool for separation. The APP/TMA sector is located inside the ACC and provides a full radar service to the airspace users.

Although traffic has decreased considerably in the last three years (some 40% less), the capacity of the centre is certainly well planned for the future; in a corner of the operations room place has been made available for a full integrated "Flow Control Cell", which is ready for operation.

Warsaw ACC.

The Polish controllers are well trained (USA; Eurocontrol Institute at Luxembourg; etc.). One would expect salaries to be at a reasonable level, but it is very difficult to make a comparison with other professions as in eastern block countries the basic salaries are all very low and almost the same.

In 1981 the controllers formed an Association, which was very soon active in professional matters. Although the total number of civil controllers is rather small (110), their dedication and motivation is very high.

Recently the Association inquired about a possible membership of IFATCA. Authorisation from their government is needed and imminent. Some problems, like the financial contribution to IFATCA, have to be resolved, since individuals are prohibited to export money.

30th April, 1983

European Charter Group Delays Data Bank Decision

by Michael Feazel

Eurocontrol's proposed central data bank would be incomplete and would use funds that could be spent more effectively to improve airports and airways, according to the International Air Carrier Assn., which represents charter airlines.

IACA officials said they would delay a decision on whether to recommend that member airlines provide information to the data bank until Eurocontrol clarifies what information is wanted and in what form (AW&ST July 11, p.34).

Postponement of a decision on compliance with the Eurocontrol requests could create delays in inaugurating the central information bank or result in incomplete data.

The data bank is intended to collect information on all flights using en route air traffic control facilities in Europe. The information is to be used to determine when an air traffic control overload is likely to occur and develop the most efficient methods of moving traffic to resolve the problem.

Actual flow control decisions would be made at the 11 air traffic flow management units in Europe. If an overload occurred, aircraft could be forced to use alternative routings on a first-come-first-served basis.

Eurocontrol is asking all scheduled and charter airlines to provide detailed data on every flight beginning in the 1984 summer season, but the agency has not finalized a standardized format for the information or a standard method of transmitting the information to the Eurocontrol office here.

Eurocontrol officials told charter airline officials during an information meeting at the Eurocontrol office Aug. 9 that the methodology would not be approved until at least October, when the transport ministers who control Eurocontrol will meet. Data bank officials also are trying to determine how schedule changes would be communicated to the information centre.

The airlines, in most cases, will have to hire and train new personnel and acquire new data processing equipment or software to provide the information. If the airlines wait until they obtain more information on the central data bank, it could mean personnel and equipment would not be in place when Eurocontrol wants to begin receiving information in early 1984.

Charter airline officials said during the meeting that the effectiveness of the central data bank would be limited without full compliance from general aviation and military aircraft. Ability to obtain complete information on intercontinental service is also a problem, because varying weather conditions over the oceans can dictate widely separate routings once the aircraft enter the Eurocontrol area.

"If you have no information on the North Atlantic, general aviation, the military and some operators who will refuse to participate, you have a big hole in the operation," David Weir of British Midland Airways said.

MILITARY FLIGHTS.

Eurocontrol has been notified it will not receive direct information on flight paths of military aircraft. Discussions are still in progress to determine whether the national authorities will collect such information and provide it.

General aviation accounts for about 10% of all traffic handled

by air traffic control facilities in Europe. Eurocontrol will ask to be notified of all general aviation traffic that knows its movements in advance. But Eurocontrol officials believe information will be available on only a small percentage of general aviation.

Because of the lack of information on military and general aviation traffic, Eurocontrol expects its data base will include information on only 80% of all traffic.

Eurocontrol is asking that all airlines comply with the request for information on flight data, but Horst Guenther, Head of the Eurocontrol Operations Division, said: "We are asking the airlines to make the data available. How and whether we can enforce that I am not prepared to say".

Eurocontrol officials said similar systems have been in effect in countries such as Germany, and there has never been a need to force compliance.

INDIVIDUAL AIRLINES.

National governments have not decided whether to force individual airlines to participate in the trial data bank programme. The International Civil Aviation Organization (ICAO) has sent a proposed Aeronautical Information Circular to the nations involved that includes proposed legal language covering the data bank. The language said airlines "should" provide information to the data bank. Eurocontrol had wanted the language to say the airlines "shall" provide the information.

"Eurocontrol's chances for a valid trial of the central data bank are being compromised from the start", one aviation official said of the circular text.

The quality of information also was questioned. One proposal is to use the same computer

tapes for the central data bank that the airlines provide to publications such as the Official Airline Guide. Such tapes, however, would include only start and destination, not which airways the airlines would use to reach the destinations. As a result, the data bank would be able only to approximate the amount of traffic on an airway segment.

Brian Martin, responsible for setting up the data bank's computer system, said plans call for the information bank to survey airlines to determine the proportion of traffic most likely to use each airway segment between major city pairs. That information would be programmed into the computer and used to project the likely amount of traffic on each segment.

Despite concerns that the gaps in information will make the data bank useless, Guenther is convinced the information generated will be much better than information now available to help predict traffic overloads.

Charter airline officials are concerned about the cost of providing the data to Eurocontrol, especially for small charter airlines that may be operating on a small revenue margin.

In most cases, providing the information will mean adding at least one employee and possibly additional data processing capability, as well as additional communications costs for sending the information to Eurocontrol by teletypewriter or data transmission system.

Scheduled airlines will be able to file one overall flight schedule per season and only a few changes in the course of the season. Charter airlines, however, may have a different schedule for every day. Even those with relatively fixed schedules, such as Dan-Air of England, may have as many as 30 schedule changes per day, according to Peter Somers, planning controller of Dan-Air. In addition to providing work for the airline, each of those changes must be punched into the Eurocontrol computer, requiring additional manpower and computer capacity.

The airlines question whether Eurocontrol is aware of the volume of data it is likely to receive from charter airlines and whether it will be able to handle it.

Martin said Eurocontrol is not sure it can cope with the load. "We won't have any idea of the total amount of data we will have to handle until we try", he said. "That is one of the reasons for the operational trial".

"The startup cost of the central data bank represents $8 million, and operating costs in following years will be $4.5-5 million", Anselme Vernieuwe, secretary-general of IACA, said. "Also, the airlines will have to spend money on manpower and telecommunications".

"That represents a large amount of money. We wonder if it could not be better spent. For example, many of the problems are on the ground. Maybe it could be used to add runways and aprons and better airways".

Eurocontrol, however, said the total cost of the data bank will be equal to only about 1% of the fuel cost for the airlines that operate in Europe. They believe that greater efficiency and reduction in en route delays will more than offset the costs.

Eurocontrol cited a 1981 International Air Transport Assn. survey which showed that 25% of all flights were delayed an average of 33 min. each. Fuel burn in 1981 ranged from $981/hr. for a Boeing 737-200 to almost $3.600/hr. for a Boeing 747.

American Airlines Flight Training Centre

The question needs no prompting; it rolls off the tongue almost of its own free will. Why has American Airlines elected to locate a purpose built training centre in beautiful downtown Crawley? Well, it's not exactly downtown but it sounds good! Come to think of it it's not particularly beautiful either! Nevertheless.... To quell this raging intrigue one has to go back twenty years to the Iron Age of flight simulation when American established its Flight Training Academy in Dallas, Texas. Over the years this Academy has developed into one of the aviation world's largest training establishments employing some 6000 personnel and the services of Boeing 707, 727, 747 and DC10 simulators. More recent times have seen the addition of the Boeing 767.

Once American's training program was under way it was decided to set up a small organization within the Academy to sell surplus simulator time to other airlines. This venture was so succesful, and profitable, that a subsidiary company, American Airlines Training Corporation, was formed to develop complete training programs. This in turn has led to contracts not only with numerous airlines but also with the United States Air Force for the training of KC10 crews and, if present bidding is succesful, for the C5 and C141 programs. In addition American has commitments to Cessna Aircraft Corporation for Citation training and to Sikorsky for the S76. Two of American's principal customers were British Caledonian and Laker Airways, neither of whom were able to justify the expense of independently purchasing their own simulators. American Airlines Training Corporation was not slow to realise the potential of establishing a further subsidiary located in Europe. Two years after conception the plan reached fruition with the opening on July 17, 1981 of a custom built training centre in Crawley, close by London's Gatwick Airport and the home of Rediffusion Simulation Ltd. Rediffusion's presence was a significant one in that the company provided American Airlines Training Ltd with its Boeing 737 and DC10 simulators accompanied by resident engineers available on a 24 hour basis.

BCAL and Laker were committed to fifty per cent of the DC10 simulator's annual availability of 5500 hours, a situation that was to change quite dramatically with the demise of Laker Airways in 1982. The resulting drop in utilisation brought with it a considerable decline in revenue.

Marketing Manager Mike Collin's job is to sell simulator time to airlines, a task he appears to

execute with a sizeable degree of success as the signing of a number of contracts soon compensated the company for the Laker loss.

The success of Mike Collin's efforts are reflected in the fact that the company's 737 simulator is currently achieving in excess of ninety per cent utilisation thus making it one of the world's most heavily utilised 737 simulators.

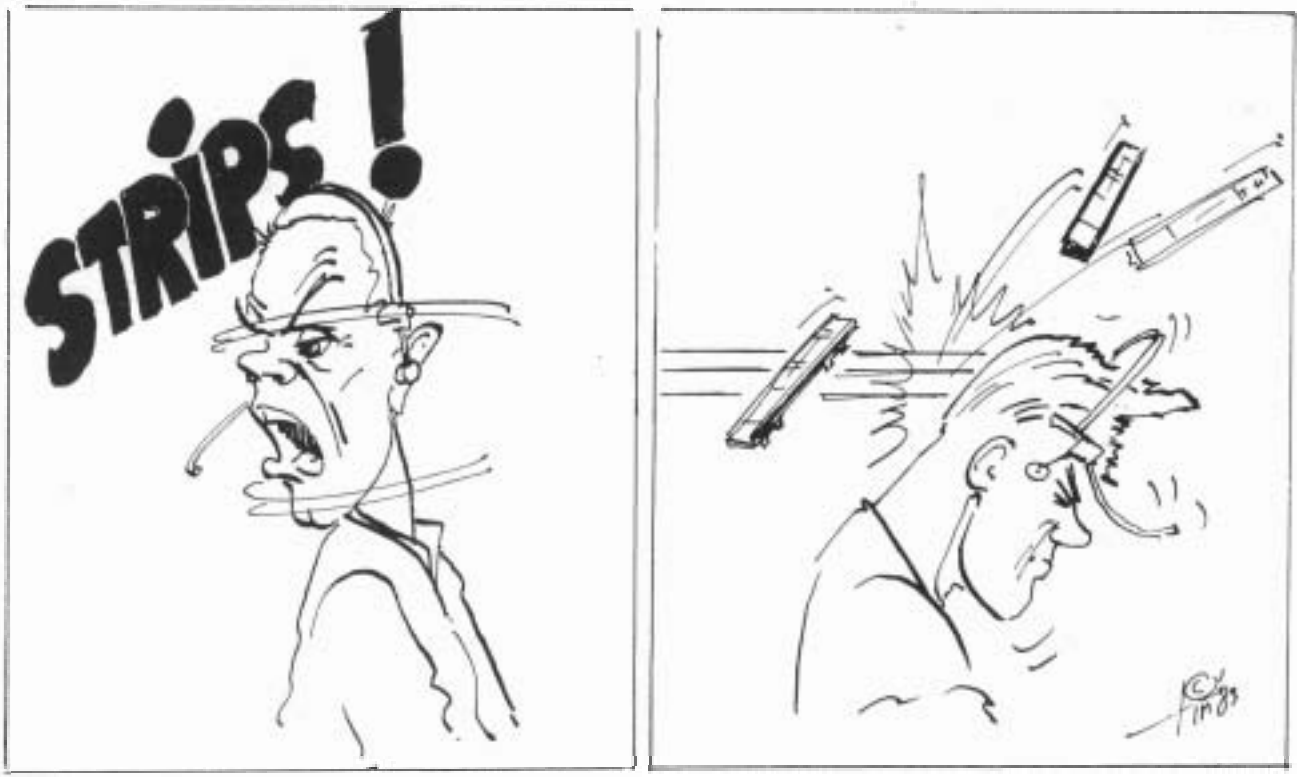
After sixteen years flying with the Royal Air Force Mike relinquished his front line status when he accepted a job with Rediffusion, or Redifon Flight Simulation as it was then. His marketing expertise was developed en route to becoming Senior Regional Manager with that company. Needless to say his practical and theoretical knowledge of flight simulation placed him in good stead for the American Airlines position.

Following an introductory talk by Mike Collin I was placed in the charge of Boeing 737 instructor Brian Long for a tour of the centre's facilities. Take a moment if you will to conjure up visions of the typical British Airways captain with plum in mouth accent and uniform pressed with military precision. Now construct an image of an open air type tending his dahlias and digging up this year's crop of cabbages and you've got Brian Long! I hope Brian doesn't take that as an insult as I intend quite the contrary. Anyway, the man used to fly Viscounts - he must be perfect!

Brian was formerly a 737 training captain with British Airways and accepted early retirement when that company initiated sizeable reductions in its workforce. He was then lucky enough to be approached by American with a view to taking up a similar ground based post in Crawley.

As we commenced our walk around Brian explained to me how the students remain with the same instructor throughout their course as opposed to having seperate instructors for ground school and air work in the simulator.

The student's first couple of weeks are spent in the audio-visual training room where he is treated to a series of slide shows, but any expectation that this might relate to a pleasant evening's home entertainment viewing family snaps are quickly dispelled! The slides depict individual aircraft systems e.g. hydraulics, electrics etc. As the slide is displayed so the student receives an aural question pertaining to, say, the operation of a particular component of an overall system. He will then select one of a multiple choice of answers. The theory is then put into practice in the systems training room where the systems are reproduced on display panels exactly as they would be seen on the aircraft flight deck. All this hard earned knowledge is then transported down the corridor and brought together in the cockpit procedures trainer, in effect a static simulator. Full instrumentation is not reproduced in the CPT as its primary task is to simulate systems and the procedures involved in their operation. The student should now be ready for four hours simulator work per day for the next nine days. Two students flying together will alternate between the left and right hand seats for two hours each. On completion of the simulation period the student



will be further checked by his national aviation authority and then round off his training line flying for his employer until checked out by the training captain.

To wind up my tour of the centre Brian gave me a quick preview of the DC10 simulator and of how faults and warnings are fed into the system although as a 737 man he readily admitted that his knowledge of the DC10 was limited.

Before Brian and I parted company I asked him about the origins of the other instructors. It transpired that all were former training captains and had been in the employ of companies like British Airways, Air Europe, British Midland, Laker and Transmeridian.

I thanked Brian for his time and was handed over to Fred Richardson who was to captain my DC10 ride. Fred was not averse to a little bad language, uttering the words ROY and EVANS in the same breath!!

In addition to Fred the crew for this two hour session comprised former flight engineer Ron Painter who would be feeding all the dastardly tricks into the system at the expense of Richard, a young Nigeria Airways first officer, and his colleague flight engineer, both of whom were undergoing recurrent training for their six monthly check.

At the press of a button we were sitting on the numbers of Zürich's runway 16. Simulated acceleration pressed us into our seats as the lightly laden '10 commenced its comparitively short take off run. Airborne and climbing to 8000 feet we entered a left turn inbound to the Schaffhausen NDB where we took up a right hand race track pattern. The aircraft's progress is plotted on a screen located just behind the captain's station and takes the form of an indelible red trace which ensnared my attention throughout the flight. Proof of the student's worth can be provided once again at the press of a button resulting in a hard copy of the screen's contents. My mind flashed back to more tender years and shooting wierd and wonderful patterns in a dilapidated ANT18 Link trainer only to climb/fall out and curse at the truthful trace left by the crab's red ink. Same result - different means!

With Schaffhausen's prescribed pattern perfectly executed we began our descent to initiate an ADF approach back onto runway 16. Richard flew two ADFs without visual reference, ending up well right of centreline on both occasions, resulting in what would have been change of underwear corrective manoeuvres had this been the real thing. But it wasn't and we were able to climb out leaving behind the tell-tale red trace's exaggerated track deviations as a reminder on the Screen's large scale PAR type display.

Button pressing technology was demonstrated to its best effect when, with the merest hint of finger pressure, aircraft and contents were "teleported" to the threshold of Heathrow's 28L. And I didn't feel a thing!

Ron Painter commented to me, "These fellahs spend six months line flying without so much as a hiccough from the aircraft. When they come to us we throw everything at them so that should an eventuality arise in reality they are able to handle it". Young Richard was about to be tested.

Lift off from 28L was immediately followed by an engine failure. Following satisfactory diagnosis and treatment we went back for more. The next take off produced a failure of number one engine immediately after V1 had been called. Naturally the take off had to be continued and we climbed to three thousand, at which point Ron arranged for a cheery fire warning on number 3. Does Ron have many friends in this business I asked myself? As we came downwind abeam the field the fire was extinguished and No. 1 relit and we continued for a two engined ILS to go around at 100 feet with a 50 foot ceiling!

And so we pounded around the Heathrow Zone in various states of disarray until a trim failure brought the session to a premature conclusion. The resident Rediffusion engineers were on hand to diagnose and rectify the fault and no doubt the aircraft was "flying" again within a short space of time.

I spoke to Richard shortly after the detail and he was far from happy with his performance. His instructors imparted one or two comments to me before assembling for the de-briefing.

My stay with American Airlines Training Ltd. was but a brief one but it allowed me to discover for myself just how successful this venture has been in its little over two years existence. Let's face it, Finnair, PIA, Arrow, Wardair, BCAL, Gulf Air, Nigerian Airways, Air Europe, Dan Air, Air Berlin, Royal Air Maroc, Cameroon

Airlines, Orion, Trans European, Luxair, El Al, Arkia and Thai Airways, amongst others, couldn't all be wrong could they?

Many thanks to Mike Collin and other members of American Airlines' staff for their time and hospitality.

I look forward to my visit to Dallas!

Paul J. Hooper.

Hiring and Firing

by Philippe Domogala

Hardly one year after 12000 air traffic controllers had been discharged the aviation world could record another mass-dismissal. On that particular day of May 12, 1982, 1250 pilots from BRANIFF were sacked, but this occurrence passed almost unnoticed by us. The American system is often praised; the consequences of this dismissal however show that not everything is ideal.

Had you been at home, you would have received a telegram "do not report for work". Those on duty had to find the best means to go home. The situation was even worse for those pilots on rest in another city or country: no provision was made for their paid return. The medical insurance scheme (social security) was cancelled with immediate effect and your last month salary cheque bounced. No finances were available for severance pay, accumulated vacation time and a removal to Texas for crews on point-duty somewhere else.

Three of the four pension funds are insolvent. That is there is insufficient money in them to pay even the minimum guaranteed by law. What led to this result? Just before operations ceased BRANIFF received permission from the IRS (Internal Revenue Service) to use money from the pension funds for a short time. Later when BRANIFF was adjudged bankrupt the IRS had no power to force BRANIFF to repay the money drawn from the pension funds.

Several courses of action have been taken and when things settle, a pilot may expect approximately 50% of what was planned, when he reaches the age of 60, while present pensioners now receive only 30% of what they expected.

With over 4500 unemployed pilots in the United States, looking for any flying opportunity, the 1250 BRANIFF ones have a very remote chance of employment elsewhere. For the lucky ones, approximately 150, who found another job, there was often more work to be done for less pay. But as a pilot who applied for a job with PSA with 60% less salary puts it: "40% of something beats 100% of nothing".

The "Big Orange" from Braniff.

Why did BRANIFF crash? Basically one can say that the BRANIFF Management did not believe that less prosperous times would come. More aircraft were acquired, resulting in overcapacity and later to an operational stop when losses were sustained. But we need not worry unduly about the BRANIFF Management. Three former BRANIFF Presidents hold top positions with PAN-AM now and many other officials are known to have found lucrative posts with other organisations.

Are you thinking that this can only happen in America? I agree, at least it is more comfortable to think so!

Sources: Aviation Convention News, 18.3.1983.
Courtesy Captain Mike Kennedy, unemployed UK pilot.

Technical Committee Column

The Technical Committee, still alive and well, is gradually accepted and appreciated by Management and hopefully by you, the controllers and assistants, as well. I would like to inform you about the activities of the Technical Committee in the past year.

Thanks to the pioneering work by Geoff Gillett and following a fruitful period under the chairmanship of Willem Pieneman, I could take over the chair of a well-functioning committee, now composed of John Faesen, Ton van Hal, Willem Pieneman, John Doyle, Jan van Eck and Roger Bartlett.

It was a pleasure to see the formation of a Flight Data Technical Committee, since we have had to deal with more subjects related to the flight data work. This team forms part of and co-operates closely with the EGATS Technical Committee. Paul Hooper is chairing a team of five, namely: Theo Guldemont, Willem Gribnau, Danny Grew, Michel Nicolay and Ab van Ommen.

The co-operation with Head of Operations, Mr. Dieben, is established by a meeting every three months, which is attended by current operations, the operations officers and the system implementation section. A shopping list (see T.C.-file) is circulated to the Technical Committee, including items brought forward by management, systems division or the Technical Committee.

Some subjects originated by the Technical Committee:

- DCP button malfunctioning.
- Frequency jamming/blocking problems
- TID sequences (CALLSIGN - ASM).
- METARS (EHEH, EHBK, LFST).
- Improvement upper wind information.
- MAP display at working positions.

Current subjects are:

- Tidiness of handsets.
- Feedback from Management via logbooks.
- In- and outbound routes EHEH.
- Callsign confusion.
- D.A. link between Brussels sectors and LNO - LIPPE.
- First aid information on heartattacks, etc., for operations personnel.

It is not satisfactory that responding to our questions or proposals takes so much time; sometimes there is no response at all. However, we are aware of the fact there might be reasons for non-action on our remarks (budget, political circumstances, future developments, etc.). Nevertheless we shall endeavour to improve the conditions which are beneficial to the provision of an even better service, without derogation to the high standard of safety.

Among others the Flight Data Technical Committee deals with the following subjects:

- Direct treatment of FPL's.
- Positioning of KDS screens.
- Rewriting of Operations Manual Part 2 (ATS related).
- Oceanic departures Brussels.
- Airway and system map at flight data positions.

So, many interesting items, most of them directly linked to our daily job. You can assist us by making entries in the logbooks, even if you think it doesn't help! It highlights the problems you have and offers us the possibility to react. Your remarks and proposals are welcome, both individual and on a team basis. We assure you that your comments will be investigated.

Another communications channel is the supervisors meeting, but I have the impression that more can be achieved in control technical matters through the Technical Committee.

Our file is always at your disposal in the operations room, together with the magazines "Flight International" and "Airports International". It is almost as interesting as the "Playboy" you are fighting for!

Chairman Technical Committee
Henk van Hoogdalem

don't forget
(WRITE IT DOWN)

NEXT COPY DEADLINE:

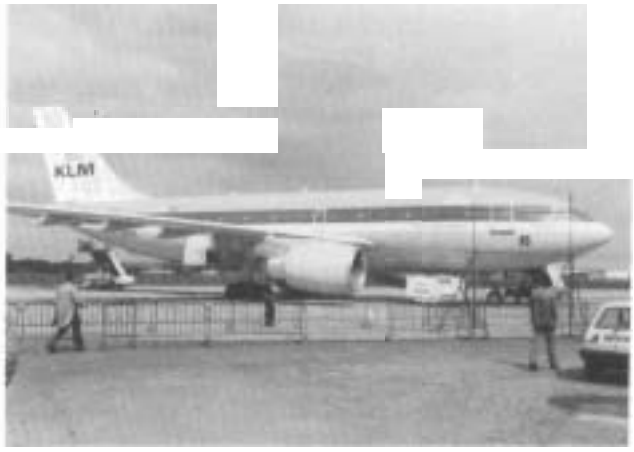
NOVEMBER 20TH

Le Bourget Air Show 1983

by Philippe Domogala

Once again more than half of the Le Bourget air show was devoted to warfare. I will not pay attention to this part of the show; everyone could gather information on this machinery from the television news. There was no doubt that the Americans stole the show with their B747-Space Shuttle Flying Circus, the NASA prototype QSRA (Quiet Short-Hawl Research Aircraft) and the B767.

But on the first day, the Europeans demonstrated a good sense of humour and marketing as well. While the Boeing spokesman, standing under the wing of a B767 in TRANSBRASIL colours, tried hard to convince the journalists that the Airbus A310 had no ability to fly long distances, the arrival of an A310, flying non-stop from Recife - Brazil, was announced. The A310 could not get to Paris earlier due to the lack of an available aircraft - they are selling so quickly! A warm chauvinistic feeling was experienced by most of the Europeans present....

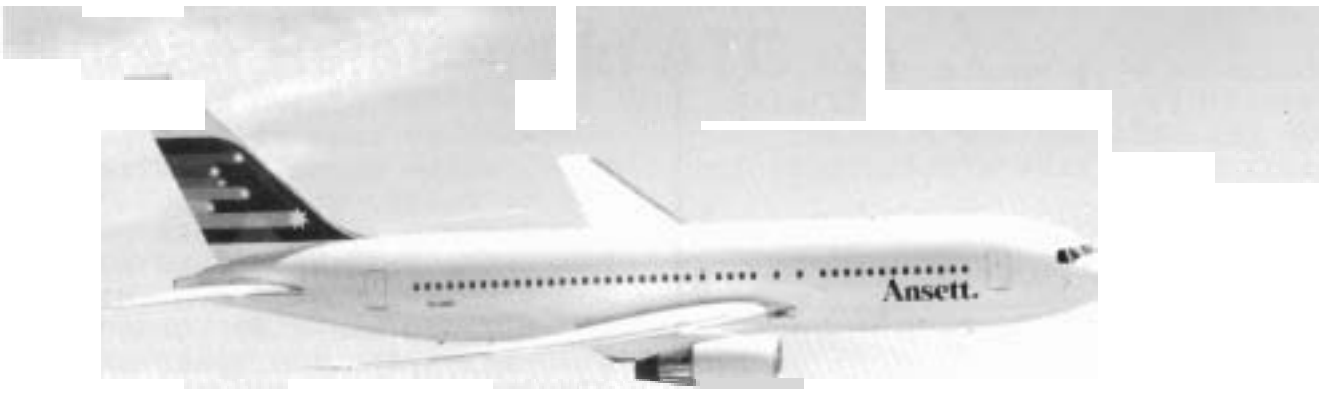


The Airbus A310 that came non-stop from Brazil.

As the pictures show it is difficult to differentiate between the B767 and the A310. Spotters need to update their binoculars. A good tip was given by the Airbus representative: "it is easy to tell the difference, the A310 is more beautiful"

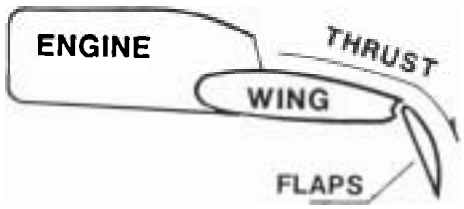
The NASA prototype QSRA is a modified De Havilland Buffalo with four jets instead of two turboprops, built by Boeing as a testbed for NASA, with the ob-

The Airbus A310 in Swissair colours. A310 certification was achieved on 11th March, 1983, nearly three weeks ahead of schedule, confirming the better than estimated performance of the aircraft.



The first of five Boeing 767s for Ansett Airlines of Australia shown on a predelivery flight test.

jective to develop an aircraft which would be able to operate from the centre of cities. In order to allow for short take-off the engines are placed above the wings. The exhausts will blow on top of the wing and the flaps, which can be extended to almost 90° (see drawing). The



NASA's Quiet Short-Haul Research Aircraft.

result is very spectacular indeed: 100 meters are sufficient for take-off and the aircraft lands almost like a helicopter in a whisper.

Another attraction was the B747-Space Shuttle, nicknamed the world largest biplane. The "odd couple" has been developed for practical reasons. Space Shuttles are built in California, take-off from Florida and return to California (Editorial note: future landings are foreseen in Florida). Both transport by rail or road and the attachment of tempory engines to the Shuttle were found impractical. This left the logical solution to carry them by air. A B747 was bought from American Airlines and modified for the job. There was no need to modify the Space Shuttle, as the same anchor points are fitted onto the B747 as those used for launching and attached on the external tank of the Shuttle.

The B747 cruises at FL230, with a speed of 300 knots and consumes 16 tons of fuel per hour, while normally a B747 cruises at FL350, at 485 knots and an expenditure of 9 tons per hour. So, relatively the B747-Space Shuttle uses more than three times the fuel burned by a normal B747. The Space Shuttle displayed in Europe was not equipped with engine and computer-systems and weighed "only" 56 Tons. With an operational weight of 94 Tons the Space Shuttle has a maximum range of about 1500 km. To prevent the tail from scraping the runway on take-off, the B747 has to carry a lead ballast of 4 tons in the nose.

The NASA 747 is used for 75 hours a year, compared to 4-5000 hours a year for an airline 747. The costs of bringing the B747-Space Shuttle to Europe? Only $ 700.000, according the NASA representative.

Human Relations in ATC

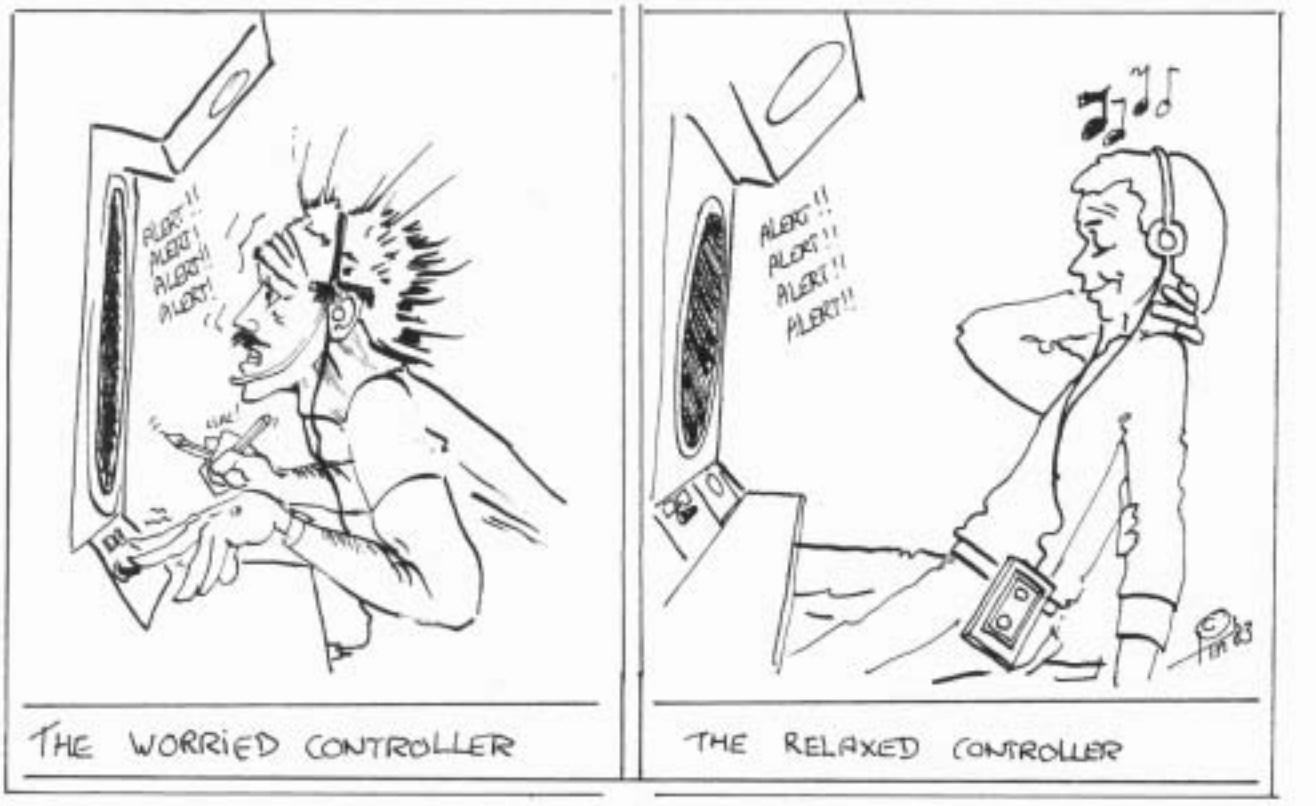
by A. J. Kulikowski

During the past several years and particularly since the 1970 sick-out, much was written, and even more was said, about human relations in the FAA. Blue Ribbon committees were named; studies were conducted; controllers were interviewed; recommendations were solicited and many were submitted. Finally in 1971 with a great deal of appropriate publicity, Management Training School was opened in Lawton, Oklahoma, and even with greater expectations the new management style was implemented. All these efforts were designed to solve nagging and seemingly ever-present problems of ineffective supervision and poor management of people, our most important asset. It would then be reasonable to assume that given this effort and commitment by the top management of the agency, positive results would soon be realized. But were they? I think not to the degree we hoped for. Why not?

This is an extremely difficult and complex question. Before we can answer it convincingly let us examine some of the factors which inhibit a successful human relations environment in air traffic control ranks, and prevent us from achieving positive results of our efforts.

First, human relations philosophy is like any other concept, subject to the individual viewpoint. It means one thing to one person while something quite different to another. On one extreme, some supervisors may subscribe to a philosophy of appeasement and give away the store, while on the other end of the spectrum others profess rigid management by command, resulting in absolute dictatorship. This great inconsistency in methods of supervision of people is very harmful to overall management philosophy, is clearly unacceptable and both cannot coexist.

Once management philosophy is defined and policy stated, it is



absolutely imperative to ensure consistent application. Each and every supervisor must either believe in and apply sound management principles, or be relieved from supervisory responsibilities if his own ideas and beliefs differ from stated philosophy to the extent that they prevent him from effectively applying these principles in dealing with people. I wish to point out that I am not advocating stereotyped management; I am simply stating that management philosophy and policy must be applied consistently while preserving each supervisor's individual management style. The problem is not that we do not know where we should be going, but just how we go about getting there.

Past experience is another factor. Looking back over the years and examining the history of management practices within the air traffic control profession we find that the record is not the best. During the decade of the 50's, and before, almost every controller hired by the agency was of military background, either as an air traffic controller or a pilot. All were subjected to military discipline and management by command style. People were simply ordered what to do and in a sense when one was told to jump the person obediently jumped; and the only question that was asked was how high did the supervisor want one to jump. Well, this worked in the 50's, but as we expanded the air traffic control system after passage of the 1958 FAA Act and into the 60's, a great many of the controllers who were hired were of non-military background and were less likely to accept this type of supervision. As the human relations progressed from bad to worse and management-labor relations deteriorated to the breaking point the infamous 1970 sick-out or strike was the end result. From this unfortunate experience we thought we had finally learned our lesson.

After taking a hard look at our management philosophy, the long overdue decision was made to train our supervisors in new management techniques responsive to human needs. The Management Training School was established at Lawton, Oklahoma, and some excellent courses were developed which were heavily committed to the sound management principles based on meaningful human relations. The courses were well presented; management philosophy and theoretical case files were excellent; supervisors participated very well, although too often with less than expected enthusiasm; and the final grades were unusually good. Everyone always graduated successfully.

But what actually happened when these supervisors went back to their field facilities? Unfortunately, in too many cases they either ignored, were unwilling or unable to practice what they had learned, because they simply did not believe in this philosophy. Under such circumstances it was wasted effort, because even the most modern and finest management training schools cannot produce effective supervisors if the concepts which were learned were not properly applied. Why was this the case? Why would the supervisor who did well in human relations theory while in a classroom environment fail to apply this concept effectively in a real life situation so as to provide quality leadership to subordinates?

Well, let us analyze the typical characteristics and personality of an air traffic controller: he is intelligent; has a quick mind; tends to be a perfectionist, impatient with anything slow or incompetent; is aware of his authority; is conditioned to issue orders expecting instant compliance; knows that his job demands perfection; thinks he's the best controller in the world; is very decisive, precise, confident, sure of himself, and cocky to the point of arrogant.

Let us compare these traits to the skills and personality required of a successful supervisor: he should be aware of people's needs; have patience, tolerance; be a good listener; have good understanding of human nature; must be deliberate and often defer his decisions; must be helpful; must accept the fact that not all human beings are superstars; must realize that most people's problems do not have instant solutions; must have genuine feelings and respect for fellow human beings; be humble yet firm; and above all, he must possess a great deal of common sense.

It may seem that if all this is true then controllers generally make poor supervisors. It would be a true statement if we generalize that when a controller transitions to a supervisor, he retains all his controller personality traits and refuses to change so as to learn supervisory skills and practice sound management principles. He simply cannot supervise people the way he controlled air traffic. He must employ his native common sense.

I am firmly convinced, and I am basing my belief on my own personal experience as well as observation of others, that a topnotch air traffic controller transitioning to the role of supervisor must make very drastic changes in terms of perceiving and working with other people. This is absolutely essential if success is to be expected. What I am saying simply is that normally an excellent controller will not make an excellent supervisor unless he is willing and able to make attitude changes and, in dealing with people, accept the fact that having responsibility for others puts these other people (his subordinates) ahead of himself. They are now more important than he is. In management of people many complex issues are raised and there are no precise solutions to many of the people-problems which require patience, understanding, and willingness to

find compromises so as to achieve a solution.

In the past years the usual practice in the field facilities was to reward the topnotch controller with the position of a supervisor. This is well and good, but any candidate for a supervisor position must understand and accept the fact that supervisory skills are very much unlike those required of the excellent controller, and he must be able to develop and apply such supervisory skills with success.

The transition from the controller to the supervisor is possible if the person is willing to believe in and practice good sound human relations principles. If a person is unable or unwilling to do this, he or she simply should not be promoted to a supervisory position. Unfortunately, in our highly technical profession the skills required of a successful controller are not necessarily consistent with those required for a successful supervisor. If we understand and accept this difference, our selection and development of new supervisors will be much better.

While improving the quality of supervision and selection process of new supervisors is critical in achieving a healthy human relations climate, there are many other important situations which a supervisor cannot control or solve. For example, too often bureaucratic interpretations of personnel policies, practices and regulations are contrary to basic human relations principles, causing unnecessary hardships to our employees. This simply does not make good sense. Simplistic interpretations of travel, payroll, and other administrative rules are a constant irritant. Too frequently decisions are made citing the letter of the law, not the spirit or intent of it, causing unnecessary frustrations to the employees. Such administrative practices undermine and eventually destroy credibility of management policies or its desire to be responsive to the well-being of employees.

Why then not be reasonable, use a common sense approach and just do the right thing? If we are going to avoid past mistakes and learn from experience, then we must concentrate on all aspects of sound human relations so as to create a quality working environment based on an open and honest interface between employees and management.


!!!
!!!
..I PREFER SEEING THEM AS RADAR BLIPS .....

How do we accomplish this? Quite easily if we really want to do this! The time has now arrived where we should practice what we have been preaching about human relations for a long time now. As a start, we must insist in timely, participative - not adversary management/employee - relationships. This in turn will create a quality work life which will promote involvement and interest of our employees in all aspects of operational matters. Professional pride, enthusiasm and a strong identification with air traffic service will prevail, to produce superior service to the users. Everyone will benefit, productivity will increase, and most people-problems will disappear. To accomplish this, we have to treat our people with respect and consideration, which all human beings deserve and are entitled to.

What I am saying here is not a new concept or unproven theory. On the contrary, many of the large and small corporations in the private sector have practiced such management philosophy with a great deal of success. For many years now, one such company with a long record of effective management is a major airline which has successfully applied many sound management pracrices and achieved an outstanding employee/management relationship.

Prior to the 1981 strike, we have had many management/employee problems to be sure, but what really concerns me today is that I can see in many facilities a regression to the old style of management by command, where supervisors simply take the easy way out instead of performing their duties with sound human relations principles of heart. The young men and women being hired today are intelligent and knowledgeable; they demand and are entitled to sensible and honest answers. Unless we respond with quality supervision and create genuine, open, common sense relationships with people - our most important resource - we shall repeat our mistakes of the past and create problems for the future.

ECC '83 Vienna

by Danny Grew

On May 24th last, a rather sleek looking red white and silver airliner broke through the overcast and banked sharply over the not-so-blue Danube on final approach to Vienna's Schwechat airport.

Vienna already abounding with history was on the eve of yet another historical event to add to its annals - namely the 1983 European Controllers' Cup, a soccer tournament of international repute.

On board the Austrian Airlines DC9 was the Eurocontrol Maastricht team, one of thirty-six teams that would participate in this eminent sporting phenomenon. The Maastricht squad comprised of no less than twenty (a historical achievement in itself) talented players, divided unevenly into three main categories: Light, Medium and Heavy. From this it can be concluded that I was one of them, and under threat from the Editor of being deprived of my quarterly INPUT for evermore should I decline to volunteer my services, here follows a short account of our Viennese excursion.

"Home" for the next four nights was the Hotel Estate, only a stone's throw away from the fair grounds of the Prater and its famous Riesenrad (ferris wheel). The hotel's more precise location, however, was the cause of the Mayor of Vienna's apparent embarrassment when he expressed great concern to the Organizing

Committee that twenty "young" sportsmen should be lodged in a section of the city populated by ladies cognizant in the profession of promoting physical and sensual fulfilment. He need not have worried - we were only there for the football (honest). The Estate was certainly not the ultimate in elegance, but it was a roof over our heads.

Having settled into our digs, our first priority was to find an eating place; for by this time our hunger pangs and subsequent digestive noises were discernible above the din of the hotel's plumbing system. Presumably this dire need to eat was predominant in our failing to reconnoitre the area more extensively before piling into the back room of a rather shady establishment disguised as a cafe-restaurant. I omitted to mention that by now our group had grown considerably with the arrival of our loyal supporters club, totalling all of four but including the lovely Gabi Ellerman. We wasted no time in getting the ober completely confused with the orders, as is the norm with us anyway. It became evident that the kitchen was beyond coping with more than two orders at a time and so lunch was served in dribs and drabs over a period of two hours. Fortunately good humour prevailed and we finally left suitably replenished - leaving a group of "ladies" in the adjacent bar, who had been observing us whilst frantically doing sums on their pocket calculators, disillusioned with their hopeful expectations and casting strong looks of resentment in the direction of our lady supporter!

By this time the rain had arrived. But, dedicated sportsmen that we were, this did not deter us from taking a short nap before embarking on an evening's rigorous training programme of pub crawling so as to ensure that we reached the physical peak required for the three extensive and

demanding sporting days which were to follow.

The forecast for Wednesday (kick-off day) called for uninterrupted precipitation. Fortunately, emulating their colleagues the world over, the Austrian weathermen got it wrong. Torrential rain did prevail most of the night seriously threatening a postponement of the day's events, but by morning the offending stratus had dispersed and given way to a dry and even sunny day.

Our first game of the day was against Las Palmas, with whom we had drawn the previous year in Dublin. We were determined to better that score but, sadly, lost 1-0 by a penalty. Not a bad result in retrospect, considering that Las Palmas finished the tournament in third place.

Doping!

In the next game, showing no compunction, we beat our hosts Vienna I by the score of 3-1.

After the lunch break we faced what we knew would be the toughest game of the day - London Airways. Over the years London had established themselves as one of the leading teams consistently finishing in the top ten. Overcoming our initial awe we took the game to them, showing great determination. At half-time we were only 2-1 down. London showed obvious frustration at not having taken a more commanding lead and this gave us the incentive to maintain the pressure in the second half. Suddenly Henk van Hoogdalem rose high into the air and the ball was in the back of the net; 2-2! No! Our ecstatic jubilation was short-lived with a most controversial decision by the referee, who adjudged inexplicably that Henk had committed a hand-ball offence. Not true - but that is football! Understandably, shaken by this injustice, the team lost concentration and capitulated to a 3-1 defeat. As we say in England, "we was robbed".

That completed our first day's football with one win and two narrow defeats. Our team had played with much fervour and style succumbing only to sports' worst enemy - just plain bad luck.

Undeterred, the team intensified their nightly training ritual finishing up in a night club where Bodo took the limelight doing his thing with the harmonica.

Thursday, the second day of the tournament, was a glorious Spring day. We had another three games to play, all on a knock-out basis as opposed to the previous day when the teams played in pools of four. This meant that each game required a positive winner. Maastricht must have achieved some sort of record by managing to draw all three games resulting each time in penalty kicks to decide the winner. Our results: 3-3 v. Belgrade; 1-1 v. Aldergrove; and 3-3 v. Malmö, caused our goalkeeper, André Abts, to face an avalanche of penalties which, he said, he was still trying to save in his sleep for many nights afterwards. This explains why Michel and I, who were sharing a room with André, were frequently woken-up during the night by André thumping his head against the wall next to his bed (true). Still on the subject of André: he will not be forgotten for a brilliantly executed save from one of these many penalties which, had they been there to witness it, would have

earned him the respect of the game's top professional keepers. Mobbed by his team-mates he confessed, "well actually I suffered from penalty fatigue and fell asleep. Luckily for me I fell the right way".

The day's tally was two wins and one defeat - all on penalties.

You all know by now what the team did in the evening.

In total contrast to the previous day, Friday - the final day - was overcast, cold and windy. Maastricht only had the one game to play and this was against our friends from Bremen. The game was highlighted at half-time when good ol' Fred le Noble turned up with Braadworst for all. The result was at this stage irrelevant, but for the record we lost 1-0.

The Maastricht team photographed during an energetic pre-match warm-up session.

C'est le moment Henri! (The Stockholm ladies supporting their team).

The final was won by Copenhagen in a hard game against Padua. In the evening the teams gathered one last time for the traditional party - most of our guys returning to the hotel with only enough time to pack their bags and rush by taxi to the airport for the 0720 Austrian Airlines flight home.

The Eurocontrol Maastricht Team wish to take this opportunity to say thank you to all involved in the organization of the ECC '83. Also very many thanks to Austrian Airlines for their most excellent co-operation and generous assistance.

The final results are:

1. Copenhagen	13. Stuttgart	25. Lisbon
2. Padua	14. Santa Maria	26. Geneva
3. Las Palmas	15. Munich	27. Zagreb
4. Amsterdam	16. Bremen	28. Belgrade
5. Prestwick	17. Paris	29. Praha
6. Madrid	18. Stavanger	30. Rome Radar
7. Frankfurt	19. Schiphol	31. Rome Airways
8. Bordeaux	20. Aldergrove	32. Tampere
9. Milano	21. Düsseldorf	33. Brussels
10. Stockholm	22. Maastricht	34. Dublin
11. London	23. Malmö	35. Vienna I
12. Vienna II	24. Karlsruhe	36. Helsinki

Innovations in the United States Air Traffic Control System

by Rob Bootsma

Introduction

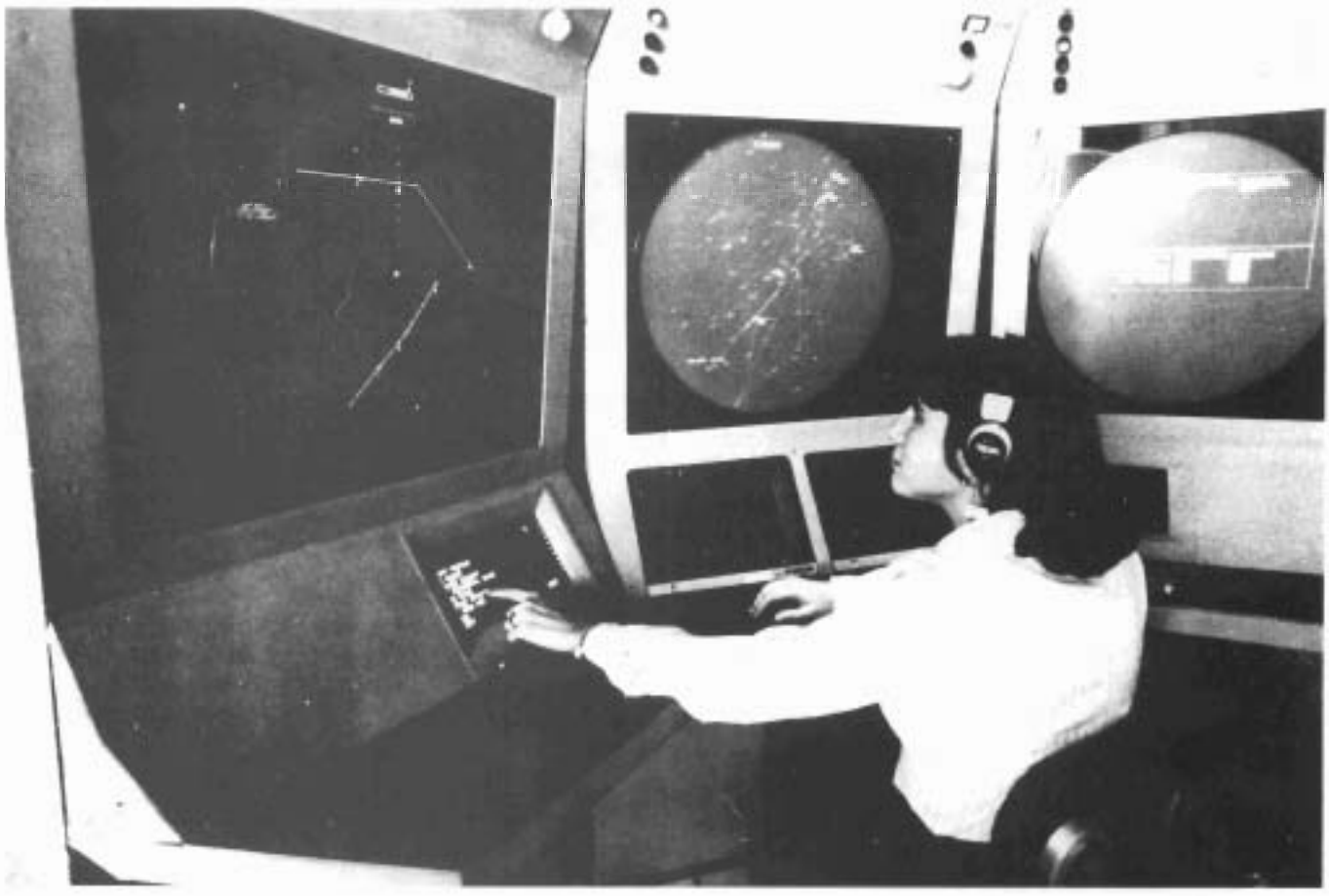
You may recall from this year's first issue that the Federal Aviation Administration (FAA) has embarked on the National Airspace System Plan, a programme that aims at an extensive modernization of the air traffic control and navigation system.

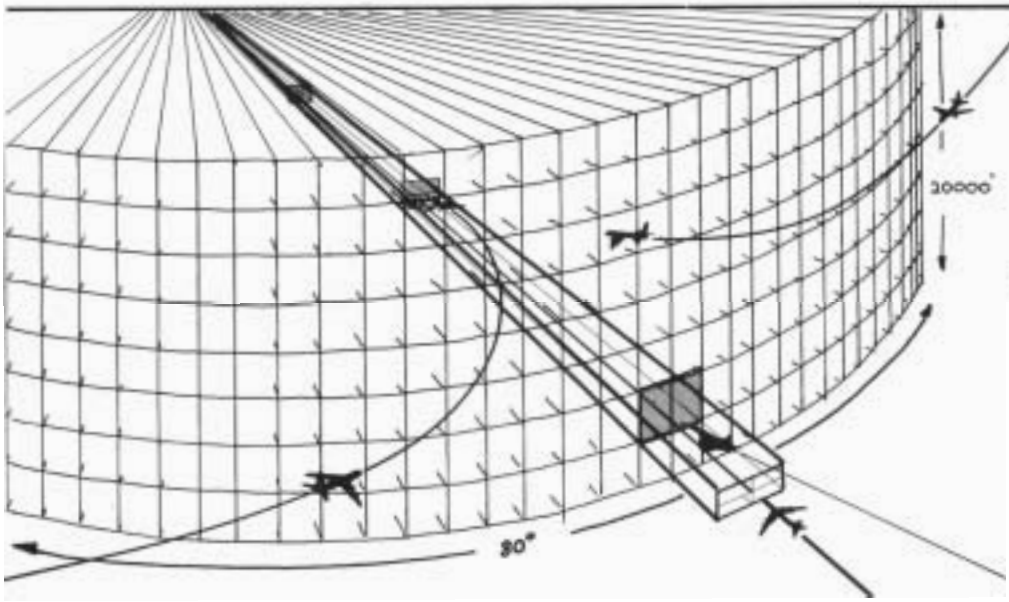
The present system has some serious limitations; among other things it is very labour intensive, it has very little capability to handle the projected growth of air traffic and it is not capable to accommodate future automation needs. The obsolete equipment shall be replaced, redesign is mandatory! The traffic load is expected to increase considerably over the next 20 years and will be handled by fewer facilities and personnel with greater precision and speed, at the same time improving safety and fuel efficiency.

It is not my intention to list the system's innovations once again but rather to amplify some principal features of the National Airspace System Plan. I am grateful to John Leyden, News Chief of FAA Public Affairs, who has made available material on the 20-year programme and permitted me to use the information in an article for INPUT.

Host Computers and New Sector Suites

At present the 20 domestic Air Route Traffic Control Centres (ARTCC) use aged IBM 9020 computers for both Flight Data and Radar Data Processing, but they cannot adequately handle the





Microwave Landing System.

Unlike the ILS' single approach path, MLS offers aircraft the possibility to select a glide path, including curved approaches, tailored to its individual characteristics.

foreseen increase of air traffic. In addition capacity limits make it impossible to enhance the software program in order to achieve a higher level of automation.

Obviously the IBM 9020s will be replaced by new "host" computers capable of using the 9020 software package with only minimal modifications. Delivery of these new computers will start in 1985 and the 9020s are expected to be replaced in 1987. Concurrent to this new software is to be developed and new "sector suites" are in the process of being designed. Field deployment is expected to be underway in 1990.

In designing the work stations for radar controllers the preferences and priorities of the controliers have been taken into account. Each sector suite will consist of three dynamic displays. The central console displays weather information and aircraft locations, including the aircraft's identification number and assigned and actual altitudes in hundreds of feet, similar to the current displays.

Flight progress strips will disappear; a second console (the right one) will provide all flight plan data such as aircraft identity, flight number, etc. The left console will primarily be used for functions associated with AERA (the concept of Automated En-Roite Air Traffic Control). By using "touch entry" devises as opposed to the current keyboard devices, there is far less opportunity for error.

Each sector suite will have its own microprocessor generating information for controller display and serving as a back-up to the main computer. Thus equipment failures will have no consequences for the whole facility but only for one sector.

Microwave Landing System (MLS)

Another key element of the NAS Plan is the gradual replacement of ILS with MLS, developed over a 12-year period and adopted by ICAO for international standardization. ILS is rigid and inflexible, as it provides a single, fixed approach path. Moreover, it does not allow instrument landings in mountainous areas. For that reason installment of the first microwave landing systems is foreseen at 15 airports, in 1985, many of them situated between mountain ridges.

MLS uses scanning beam techniques and provides precision guidance within 20 NM around an airport up to an altitude of 20.000 feet. The MLS ground station emits two fan-shaped beams, scanning vertically and horizontally. The aircraft's azimuth and elevation are determined from the time differences from the TO and FRO sweeps. These data, combined with

slant range data from distance measurement equipment/precision (DME/P), determine the aircraft position with greater accuracy.

This higher precision in locating aircraft and the wide range of final approach paths increase the operational flexibility and efficiency considerably, permitting controllers to make optimal use of terminal airspace and runway. MLS also guides pilots executing a missed approach. Compliance with noise abatement procedures can be attained by keeping aircraft high over populated areas before descending on a steep glide path.

Environmental factors such as snow buildup and soil moisture do not influence MLS, since the MLS signal is radiated directly into space. The equipment is also less sensitive to building and terrain interference.

The procurement of all 1250 MLS units has been approved already. These units will be in place by the year 2000 and eventually MLS will substitute ILS.

Traffic Alert and Collision Avoidance System (TCAS)

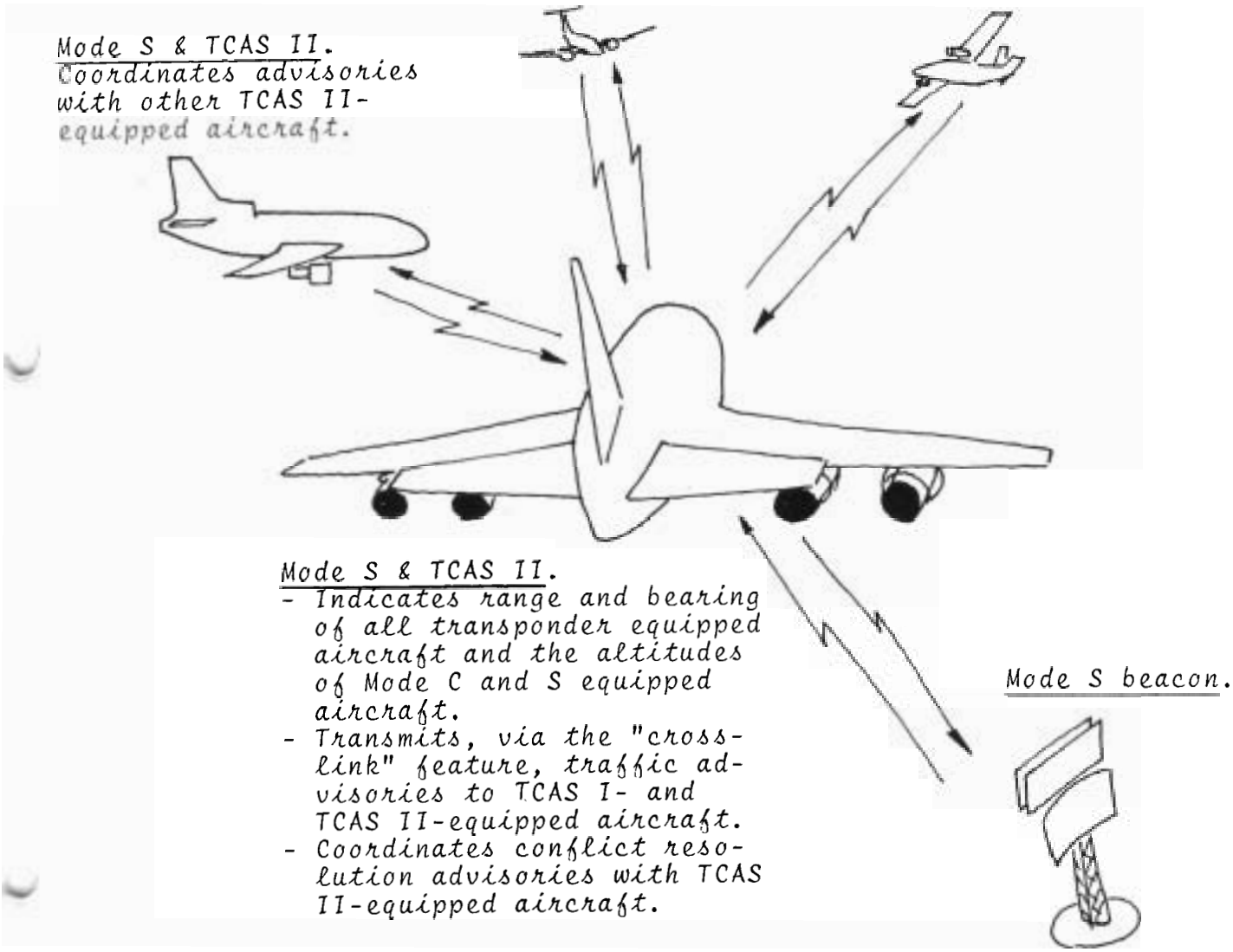
In June 1981 FAA Administrator J.Lynn Helms ended a 20-year debate on collision avoidance and opted for TCAS, an airborne traffic alert and avoidance system, capable of operating independently of the ground-based ATC system but compatible with it. Besides TCAS is capable of working in high-density traffic environments and does not require that every other aircraft be similarly equipped.

The TCAS concept includes two separate but compatible systems. TCAS I, a relatively simple system for general aviation, will alert pilots with a visual or aural signal to the close proximity of other aircraft that carry similar equipment or a SSR transponder with or without an encoding altimeter. Unless TCAS I is enhanced, it will not give position information and it is the pilot's responsibility to locate the intruder visually and to determine whether evasive action is necessary.

An Airborne Intelligent Display (AID) shows a TCAS II-equipped aircraft at the centre of a two-mile range ring at an altitude of 10.500 feet. An "intruder" at 7 o'clock is 400 feet below the TCAS II aircraft, while another proximate aircraft is 500 feet higher at 1 o'clock.

TCAS II, designed for airliners, will detect potential traffic conflicts, advise pilots of the danger and display appropriate resolution advisories if required. Minimum TCAS II will provide resolution advisories in the vertical plane. The principal difficulty with reliably tracking intruder aircraft in high-density areas is that several aircraft may reply simultaneously to a TCAS II interrogation. A combination of sector interrogation and sophisticated direction-finding techniques enables TCAS II to determine the bearing of the intruder with an accuracy of about 8 degrees. Bearing measurements with an accuracy of 1-2 degrees are in the process of design.

Another major component of the new system, the Mode S transponder, will transmit periodic "squitter" signals to inform all TCAS-equipped aircraft in the area of its identity and altitude. TCAS I-equipped aircraft will be informed of the position of a TCAS II-equipped aircraft; the



airliner will transmit, via the so-called "crosslink", its position and what evasive manoeuvres it intends to make.

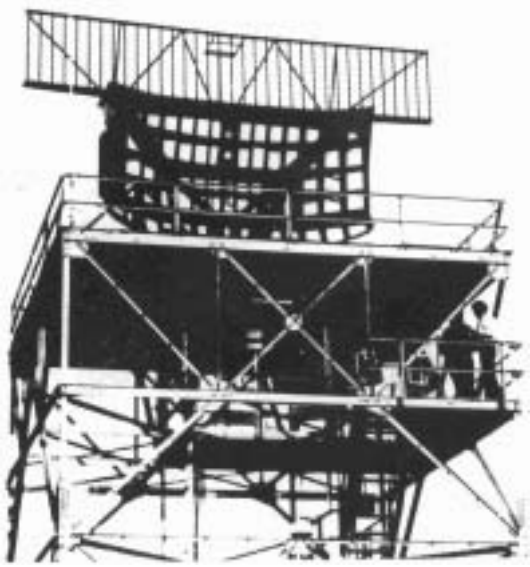
Some other important features

For all aircraft that fly above 12.500 feet it will be mandatory to be equipped with Mode S by 1990 and by the year 1993 it will be required for all aircraft that operate above 6000 feet.

The Mode S transponder can accommodate more than 16 million identity codes. The system communicates with aircraft on an individual basis and each aircraft will respond only to interrogations addressed to it. This eliminates the disadvantages of present SSR transponders, such as garbling, fruit, sidelobes and "ghosts".

Mode S also provides an air-ground communications link, which would relieve pilots and controllers of many routine communication . It would be possible to transmit via the data link such information as wind and weather conditions, airport advisories and confirmation of ATC clearances. Implementation of Mode S is scheduled for beginning 1986.

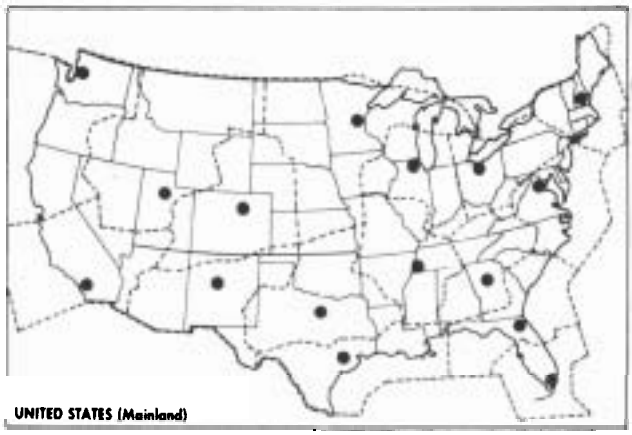
A modified instantaneous vertical speed indicator (IVSI), indicating the resolution advisory "do not descend" by means of the lighted bars. An alternate climb or descend advisory could be displayed by lighting the appropriate arrow in the centre of the instrument.



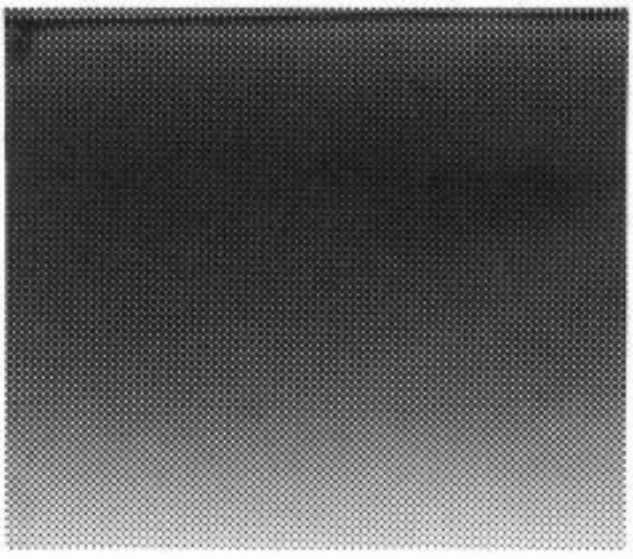
The figure shows a five-foot open array on top of an ASR-8. This new terminal radar beacon antenna, installed at Miami International Airport, will serve Mode S in tomorrow's system.

In the long term, air traffic control will become increasingly automated. ARTCCs and terminal facilities would be consolidated. The use of the same basic computers and sector suites allow for an automated interface. AERA will provide direct fuel efficient routings and regulate the overall flow of traffic. The system will detect possible conflicting flight paths and generate conflict resolutions for automatic transmission to the pilots. The controller's role would be basically one of a system manager, but he would be free to override the computer.

The FAA conceives the airspace system as a combination of equipment, techniques, procedures and skills and expects that the upgrading of the system will increase safety, reduce delays and give pilots greater flexibility.



ARTCC coverage areas will change as the number of centers decline in 1990-2000.



Richard C.W. Weston.

A memorial service has been held on Monday 26th September, 1983 at the New London Synagogue, Abbey Road, St. Johns Wood, London (N.W.).