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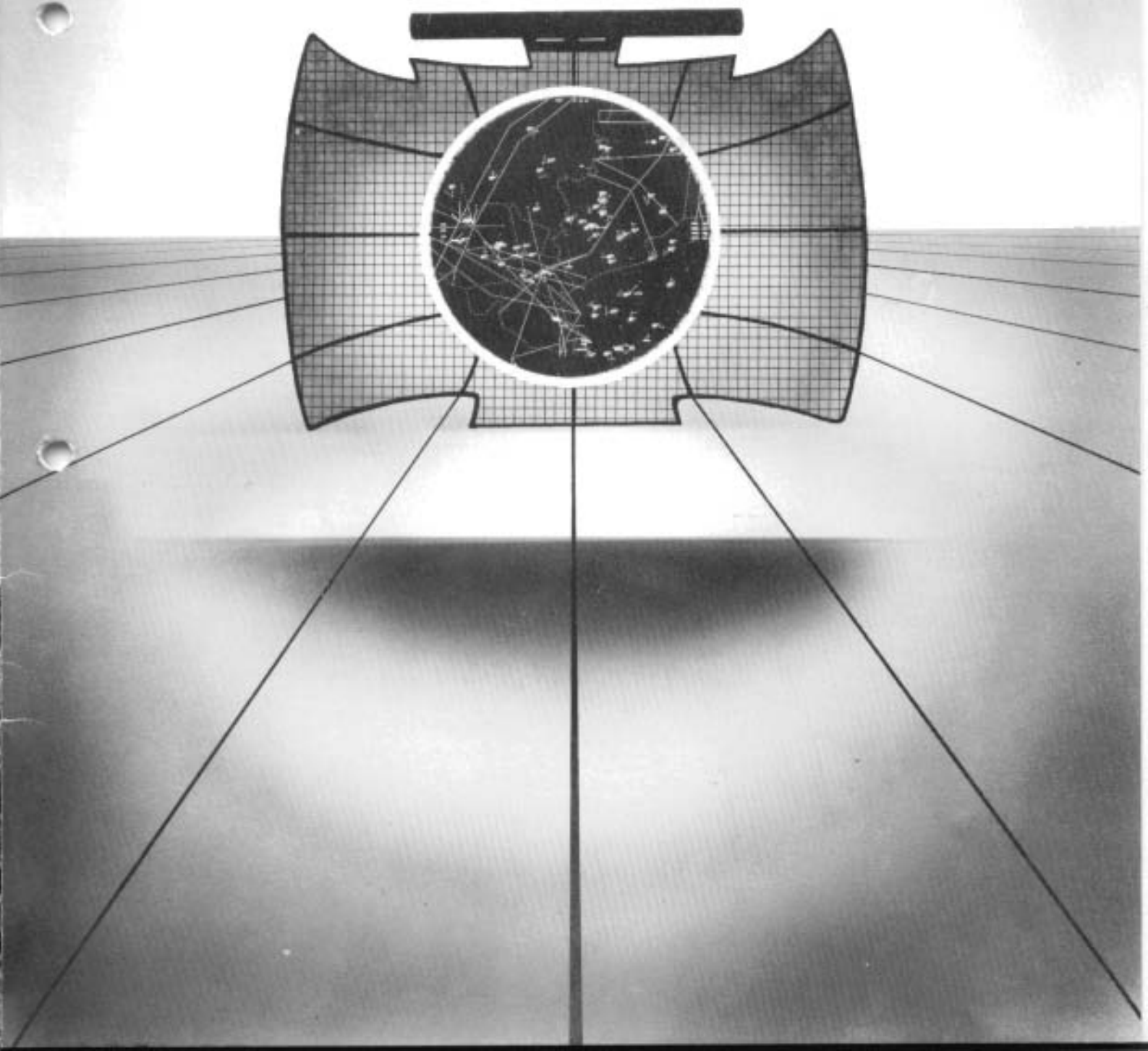

INPUT

the magazine of the
EUROCONTROL GUILD of AIR TRAFFIC SERVICES

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Jan van Belle, convinced of the fact that a change of staff would benefit INPUT, stopped his activities as an editor. We owe him and his team, who have performed their task perfectly and have improved INPUT to a large extent, many thanks.
The good standard maintained in previous years means that the coming man will have more difficulty to fulfil his job and to meet everybody's wishes, as it is not easy to be original all the time. So, many of us will have their hopes and doubts with ragard to the future of our magazine and wonder whether changes will take place.

I am expected to breathe new life into INPUT. To carry this into effect successfully I depend to a certain extent on you. So, do not hesitate, your contributions, comments, new ideas and critisism are welcome.
Mainly because they had other work to be done and nearly no free time left, some of the old editorial team do not wish to continue their INPUT activities. However, we can still count on the experience and knowhow of Martin Germans and Paul Hooper. Of course, I will do my utmost to present you with interesting material. In particular I will endeavour to publish articles principally dealing with air traffic control and aviation in general, by which I will not lose sight of the humoristic part. This issue hopefully gives you a first and correct impression.

Before you devote your time to the following articles I like to trouble you with one other thing. Everyone knows that air traffic controllers are concerned with safety; the main objective in the provision of air traffic services is a safe flow of air traffic. In this respect Dan Air's Flight Safety Review of December 1982 showed a depiction of a staircase with seven steps, described as follows:

1. We're doing all right without it.
2. We've never done it that way.
3. That's not our responsibility.
4. We tried it once and it didn't work out.
5. We're not ready for that.
6. It costs too much.
7. It won't work.

I think that you can agree with me that in our job, which I perceive as a service, one should never shelter behind one of these quasi-arguments. If you do, you must face the consequences, namely stagnation of safety.

Editor

PRESIDENT'S MESSAGE
Reflections on Past and Future

by J. Gordts

It is not too much to say that 1982 was a year of revival for EGATS. Apart from the 10th Anniversary activities and the Fuel Economy Forum, we were engaged in a large number of activities.
Many contacts took place with airlines, aeronautical organisations and industry. The talks and discussions with various Eurocontrol authorities have intensified. We were able to maintain our position in IFATCA and participated actively in the Amsterdam Conference and in the Luxembourg Regional Meeting. We were able to defend the professional interests of some of our members, and last but not least, we have improved our magazine INPUT significantly and were able to produce a high quality anniversary issue.
We have managed to establish ourselves as a real professional association, not only vis à vis Eurocontrol, but also in the European aviation scene. Some political decisions with regard to our future provoked adverse reactions from fellow associations and we have been obliged to react strongly against the views and opinions of the German association VDF.
In addition we were engaged in lengthy discussions with the Dutch Guild, using the intermediary of the Dutch Pilots' Association, in the hope to reach a common view with regard to the future activities of the Maastricht Centre, unfortunately without success.
I am afraid that we will have to live with this situation and we can only hope that time will heal, so that we will be able to enjoy a normal relationship with our immediate neighbours in the future.

In spite of all this there is a large amount of goodwill and enthusiasm amongst all those who have a function within EGATS. On the other hand I regret that the association's work is always to be done by the same people. I still have the impression that the main interest of our members is not one of a purely professional nature and if we could measure the motives of our members scientifically, we would be able to say that 75% has an interest in our travel facilities, 15% in the activities of the Technical Committee and 10% in the remaining activities. This is highly frustrating for those who are spending large quantities of their free time to give this association a professional outlook.
Therefore I wish to appeal to all members to adopt a more professional attitude; as a member of EGATS you are expected to do something more than just making use of the travel facilities.
After reading the annual report of the travel section you will realize that the activities have increased spectacularly in 1982. It is not the intention of EGATS to reduce these activities, but you will understand that the members of the travel section had to impose regulating measures in order to cope with the increasing workload and also to safeguard a fair and reasonable distribution of the available facilities.
With respect to 1983 activities EGATS will continue its efforts in representing the controllers' view in its negotiations with the operation division. EGATS is aiming at improved professional recognition and increased participation, especially in LOA discussions.
A delegation will be sent to both IFATCA '83 and CONVEX '83. Moreover we are investigating how EGATS can be involved in the

opening of the renewed airport Beek and whether a lecture on stress is still attainable. Finally we are looking forward to the visit of the German Pilots' Association to our centre on March 7.

(Editorial note: we can look back at a vivid discussion with the German pilots. A full report will be produced in our next issue.)

Provincetown - Boston Airline

by Paul Hooper and Danny Grew

The power came on and almost immediately the tail wheel lifted from the runway. Despite its advanced years the airplane displayed no lack of enthusiasm to return to its natural element. Off Miami's runway 12 the DC3 entered a leisurely left turn to pick up a westerly heading for Naples on Florida's Gulf Coast.
This particular aircraft, N137PB, had originally been built for United Airlines but for reasons probably best known to the United States Army Air Force was not delivered and instead donned a military uniform in July of 1941.
6000 feet and we were threading our way west between the bulbous cumuli and paralleling the famous

A PBA Aztec shares a crowded ramp at Miami in December 1982.

Alligator Alley. The stewardess in her smart pant suit looked somewhat out of place in the old airplane; one almost expected to be served barley sugar candy by a middle aged frump in a calf length skirt, hair in a bun and forcing a bright red lipstick smile. Fortunately we weren't! The aircraft's stay in military attire was but a brief one and by July of 1944 it had been demobilised and sold to Northwest Airlines. In later years it saw service with Braniff International and Trans Texas Airways, amongst others, before acquiring the livery of the Provincetown-Boston Airline and the registration N137PB in 1975.

This Cessna 402 basks in glorious sunshine at Provincetown on the 4th of July 1980.

Forty one minutes after departure from Miami 137 gracefully settled on to the Naples runway and taxied in toward the new ramp and terminal. The topography of Naples airport had changed quite considerably since our previous visit back in 1979 and clearly the emphasis had been placed on making the passenger's transit through the terminal and surrounds a more appealing experience.
The aim of our visit on this occasion was to see and photograph the latest addition to the PBA fleet, the Nihon YS11. At the time of writing four of these 58 seat aircraft had been acquired from Piedmont Airlines

thus enabling the company to offer increased capacity, when required, on both its scheduled services and ad hoc charter operations.
Over the last few years the aviation press has recorded, with monotonous regularity, the fight by numerous airlines to survive the current financial climate and we are all to used to reading of carriers reducing capacity, dropping uneconomic routes or laying off staff. Fortunately for PBA headlines featuring the airline have been able to relate quite a different story. During the third quarter of 1982 PBA carried a company record 262.194 passengers, an 85,4% increase over the corresponding period for the previous year. During the month of August 1982 the airline boarded in excess of 100.000 passengers for the very first time. Not only a company record but quite possibly the first time ever for a third level carrier.
One of the principal attributes behind PBA's success is its philosophy of supply and demand, a philosophy which effects a far greater influence on the airline's operations than the average member of the travelling public would ever realise, although doubtless numerous newcomers to PBA's intra-state operations in Florida have pondered why the service should be provided by a company purporting to afford transport-ation between Provincetown and Boston - 1300 miles away! Anything more than a cursory flip through the company's in-flight magazine would set the enquiring passenger's mind at ease, that PBA does in fact have

Cessna 402 at Naples in November 1979.

two totally separate centres of operation. The Northern Division provides scheduled services between a number of points in Massachusetts with connections to New York City, whilst the Florida Division operates schedules radiating from Naples, Miami and Tampa. In order to realise maximum utilisation of

DC3 N34PB sports an earlier livery at Miami in April of 1978.

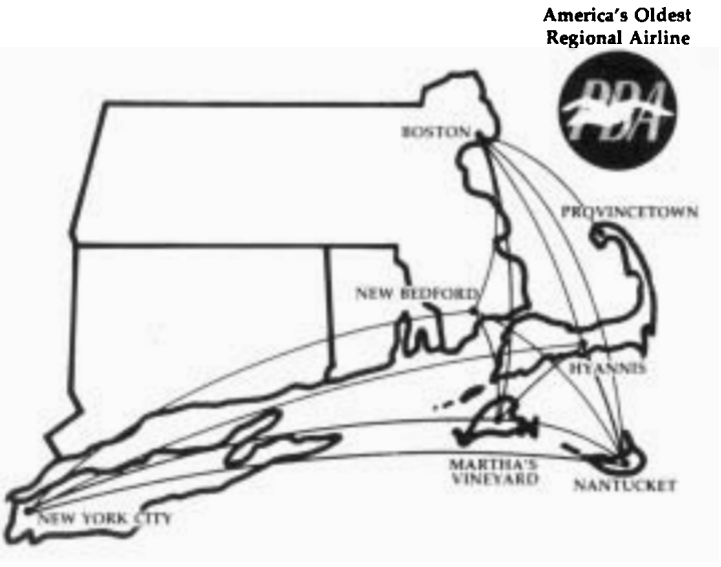
One of PBA's Martin 404s at Miami in April 1978.

A Martin 404 at Naples in November 1979 with the current livery but still wearing "Naples" titles.

One of PBA's more recent acquisitions, Bandeirante N91PB at Naples in December 1982.

the opportunity of gaining first hand experience of the YS11 on a flight to Tampa and return.

For those who like to get there just that little bit quicker the YS11 knocks approximately 15 minutes off the DC3's elapsed time for the Naples-Tampa sector. Those who appreciate quality travel will of course not mind enduring all that a DC3 can mete out for an extra 15 minutes.
I (PH) remember flying this route in a DC3 through a horrendous thunderstorm back in 1980. The rain was hammering on the roof, the thunder reduced the sound of the two Twin Wasps to that of mere sewing machines and the turbulence seemed determined to test the structural integrity of both airplane and occupants. Why am I telling you this? Just so's you know how much fun is to be missed by flying the YS11 and riding the smooth air above the storm!
The YS11 is much like any other twin turboprop except that it seats more than its contemporaries. For the "purists" who travel because they have to the YS11 will probably have the effect of maturing PBA into a "real" airline. For the enthusiast quite the contrary!
We were in the company of PBA for a brief few hours, but this did not prevent us from coming away with all the right impressions. The staff seemed genuinely happy to place themselves at the



customers disposal and appeared to be proud of the company that employed them - a rarity indeed. Believe us, this airline is going in the right direction. Setting precedents and standards such as theirs cannot be wrong. We have decided that if our promotions don't materialize this year, our applications will be on their way to PBA's Personnel Department forthwith. What did they do to deserve that?
PBA, many thanks for all your hospitality that day. Long may your success continue.

One of PBA's four YS11s at Naples in December 1982.

Future Planning for ATC in the USA

by Mr. J. Lynn Helms

The following article is a condensed version of the 71st Wilbur & Orville Wright Memorial Lecture on "ATC into the 21st Century" given by Mr. J.Lynn Helms of the U.S. Federal Aviation Administration, on the 16th December, 1982.

In the ten years up to 1993 we can expect an

- 85% growth in domestic air carrier passenger miles
- 231% growth in commuter passenger miles
- 67% growth in general aviation hours flown and
- 112% growth in helicopter hours flown.

To accomodate this growth the FAA has produced the National Airspace Plan (NAS) based on the following discussions:

1. ATC Services will continue to be the fundamental means of ensuring aircraft separation. This has been a controversial matter since some elements of the aviation community believe that we should move towards a system in which the pilot is responsible. But after studies of using displays of traffic information in the cockpit, it became clear that a safe and efficient traffic flow must be provided by the ground-based ATC system for the foreseeable future.
2. FAA plans to make major changes in communications systems using networking satellites and digital data exchange.
3. There will be further automation of the more routine ATC functions.
4. ILS will be replaced by MLS.
5. Runway capacity will be improved at busy airports.
6. Automated and semi-automated weather observation systems will be provided.
7. Provision will be made for direct pilot access to real-time weather information.
8. ATC management functions will be modernised.
9. There will be further development of airborne collision avoidance systems based on Mode S.
10. A decision has been reached to make a transition from the existing secondary radar

system to the carriage of Mode S transponders. After 1990 aircraft will probably need to be equipped with Mode S above FL 125 if they wish to participate in the ATC system.

11. It is expected that primary radar will be phased out for en-route ATC separation services by the year 2000.
12. Improved weather services for ATC will be provided by Doppler Weather Information.

NEAR TERM ENHANCEMENTS.

- An enhancement of the current conflict-alert functions in use in en-route systems, including cases where IFR and VFR aircraft approach conflict situations. Target date 1985.
- A conflict resolution advisory function to provide the radar controller with a display of alternative conflict resolution actions. Initial implementation should be available in 1985.
- An en-route metering system to allow absorption of delay and the provision of optional fuel descent profiles is planned for 1983.

LONGER TERM ENHANCEMENT.

A computer modernisation programme, followed by a newly designed automation system together with new sector suites and system software. Contract award for the sector suites, design of the new system architecture and redesign of the software is expected this year.

AUTOMATED EN-ROUTE ATC (AERA).

The objective of the Automated En-Route ATC System (AERA) programme is to attain the highest practical level of ATC automation, allowing computers to do as much of the routine work as possible. The FAA is convinced that the provision of high levels of automation will improve efficiency and productivity and make the system less manpower intensive.

TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS).

These systems have been selected to provide an independent airborne backup to the ground-based ATC system. The heart of this system will be the Mode S transponder. TCAS will provide climb/descend resolution of conflict advisories in high density airspace and proximity

warnings of nearby aircraft and other features. The operational deployment of Mode S is expected to begin in 1986 and is an important element in the FAA's automation effort.

SUMMARY.

In summary there are major benefits to be achieved from the implementation of the National Airspace System Plan. There will also be a cost incurred by the users and a need to carry additional airborne hardware. Critically important is the support of the aviation community. It will require the concerted effort of all elements of the community to study, comment and then maintain their enthusiastic endorsement of this FAA initiative.

(Many thanks to Geoff Gillett and Henk van Hoogdalem, who gave their time and effort to make the publication of this abridged version possible).

Legal Responsibilities of ATC

by Mr. Richard Weston

Mr. Weston, well known to air traffic controllers for his successful defense of the controllers involved in the Zagreb mid-air collision, is a principal consultant at Aviation Consultants International and as such routinely involved in aviation litigation.
The following is a presentation to the 2nd Bi-ennial Convention of the Civil Air Operations Officers' Association of Australia in Melbourne on November 1, 1982.

It is an inescapable fact that contributory factors to a large number of the worst accidents in recent years have included misunderstood communications. I worded that sentence very carefully and particularly in such a way as not to impute blame to anyone. Let us simply look at the record, we do not have to examine it because the mere mention of the names is sufficient in itself to chill the air of any ATC Conference. Zagreb, San Diego, Tenerife with Pan American and KLM, and Tenerife again with Dan Air, to mention but a few. The requirement for clear and precise communication in aviation stretches from the drawing board through just about every phase of the industry. The classic case, which simply boiled down to communication, was the Paris DC 10. The

manufacturer, the FAA, the airlines, everybody that was anybody, knew about the problems with the door-locking mechanism of the rear baggage door. Everybody that is, except the man who had to close the door. The poor baggage loader - nobody thought of telling him. It was not a massive error, it was a little mistake. In fact it was only in relative terms, considering the size of the DC 10, a small locking bolt, but it killed 346 people.
Now in the ATC branch of the aviation industry, without putting an exact percentage on it, it is fair to say that a large part of air traffic control responsibility is in the field of communications. In the broad sense during the planning stages of flight and in the more direct sense in the control of flight. When one looks at the scope for error, no pun intended, it is nothing short of astonishing that the system works as well as it does. It is this breeding ground for errors that I want to examine today.
Let me say right away, that I view air traffic control as a service industry and the service can only be effective with the full co-operation of the people on the other end, the flight crews. It is of no consequence to a dead passenger's family how much gold braid may have been present on the flight deck, what their total cumulative flying hours were, what the result of their recent medicals and proficiency checks were. Without the ability to communicate properly and clearly in an environment where their airborne colleagues are doing likewise, the world's best aircrews are simply a menacing liability to each other. Communication is a two-way business with the onus on all those in the "loop" to play their part. In essence communication can be defined simply as the passing of intelligence from one person or body to another. In few areas does the failure to communicate adequately have such dramatic effect as in aviation. If understanding the message is the key to effective communication there is clearly a responsibility on the part of the communicator and the communicatee to ensure that the understanding is correct.
In air traffic control terms this is accomplished by requiring pilots to "readback" certain instructions in order that the controller may be satisfied that the message has been received correctly by the pilot. The circumstances in which a full readback is required include, level instructions, heading instructions, airways or route clearances, clearance to enter or cross an active runway, SSR operating instructions, altimeter settings, VDF information and frequency changes. This requirement which reflects ICAO practice is laid down in the United Kingdom AIP. Many other countries similarly detail the requirement. In doing so the instruction clearly places an obligation on the pilot to readback these items and also by inference on the controller to ensure that they are readback. In practical terms this may pose great problems on a busy frequency where the over worked controller probably feels he has something more important to do than to enforce a readback from a recalcitrant pilot. There is a clear obligation on both parties to ensure that the procedure is complied with. Let us look at some examples.
An aircraft is given a clearance by departure control "to flight level 140", because of inbound traffic descending to flight level 150 and is later requested to report "through 90".
The controller wondering why the aircraft has taken so long to reach flight level 90 requests the aircraft's level and to his consternation discovers the aircraft is at flight level 170 climbing.

On investigating the incident it was ascertained that the pilot was under the impression that he had been recleared to "flight level 290".
Instructions were immediately issued that aircraft would in future be asked to report passing flight level 90.
The use of the word "clear" in taxi and holding instructions should be avoided if misunderstanding could arise should a pilot miss a word or two.
For example, the following clearance is passed.
"Cleared into position for takeoff" or "cleared into position, standby for takeoff".
If the message was not clearly received and the pilot understood the message as -
"Cleared into position and takeoff" - one shudders to think of the possible implications. It was demonstrated with appalling clarity in Tenerife.
The safer phraseology would be, "cleared into position and hold" and thereafter specific takeoff clearance should be given. It has been said that in aviation we must learn from the mistakes of others. We do not have time to make them all ourselves; we must put our hindsight where our foresight should be.
The words "do not" or "don't" can easily be misunderstood or even missed altogether. For example, a pilot is given the following clearance, "cleared to taxi to the holding position runway 21, don't cross runway 15".
The pilot could receive the clearance as, "cleared to taxi to the holding position runway 21, cross runway 15". The safer phraseology would be, "cleared to taxi to the holding position runway 21, hold short of runway 15".
The pilot would immediately know that there would be a very good reason for holding prior to crossing 15.
"I have got you on radar", this phraseology does not define whether the aircraft is under radar control, radar identified or what.
There are a number of other expressions which are improperly used by both controllers and pilots. Here are some unusual terms used when controllers and pilots are well known to each other.

"Top of drop", for top of descent, when it would be preferable to say, "request descent clearance at...." and if not received timely the pilot could give the reminder, "standing by for descent clearance".
Here is another as the aircraft commences descent, "we are coming down now" or "on our way down", instead of out of flight level blank for flight level blank or blank feet.
What about, "we are there now", meaning we have reached the cleared flight level by saying, "level at flight level".
"This time", instead of giving the accurate time over a reporting point. How about, "hello Joe, two minutes to go", instead of request descent at. For separation purposes one cannot stress too strongly the need for accurate reporting. There have been instances where position estimates have been as much as seven minutes out, quite serious when a ten minute procedural separation is being applied. The expression, "flight level" or "thousand" is often omitted.
Air traffic problems are increased by the neglect to follow good airmanship rules. The following are some examples.
An aircraft is given a STAR and while monitored on radar is observed to have moved off the STAR heading for another NAV AIDE, when ATC queries the intention he is advised that the VOR is scaloping.
Entering a holding pattern at a high airspeed and as a result overshooting the safe limits of the pattern: failure to report any problem with the aircraft's own navigation or communication equipment which might lead to a total communications failure or effect navigational capability of an IFR flight in congested terminal areas or control zones: switching over to the company frequency without the permission of ATC: accepting a clearance which is not clear and/or not reading it back or clarifying it before complying: deviating from a flight plan route and thus possibly interfering with adjacent routes: diverting around thunderstorms or very bad weather without notifying ATC.
Here are a variety of other comments which could effect safety. ATC has often been heard to request "report approaching a flight level". For example, an aircraft is given descent clearance from flight level 350 to flight level 150 and told to report approaching flight level 200. What is intended here? Is it to confirm that the aircraft has passed through a level, or required to level out at some level? Whatever the intention surely when an aircraft leaves flight level 350 he is already approaching flight level 200 or at what level would he be considered approaching flight level 200.
Neglecting to use callsigns, or improper use of callsigns can easily lead to confusion and even accidents. An example of this is where only the flight number is used and the company identification is omitted.
Some years ago there were two South African Airways aircraft with RT callsigns, SA 803 and SA 308, which often arrived at Jan Smuts within two or three minutes of each other and often the wrong aircraft would acknowledge an instruction necessitating the controllers to be especially vigilant.
In this case even when using the full callsign the danger existed of errors occurring.
The use of the word "OK" and clicking of the microphone button as acknowledgement should be banned.
Another word, reference Tenerife and Dan Air, which is often misused is "Roger" - which is sometimes thought to mean affirmative. I think we can do without it. Bad annunciation and speaking too quickly, especially by controllers working in a high density area, tends to delay

rather than expedite matters if pilots have to request repeats. And, of course, one must not lose sight of the fact where international operations take place there is a far greater risk of misunderstanding due to the different nationalities involved.

I believe that however familiar many professional controllers may be with some of the pitfalls listed above that complacency can be a very grave danger and that it is up to management and controllers alike and to training Captains and line Captains to ensure that these pitfalls receive the widest possible circulation. Forewarned is forearmed.

On so many occasions we, and by that I mean the industry and the travelling public, get away with it. We report a near miss. We categorise it and we file it. But, don't we all know that when there is an accident the knives are out, the fingers are pointing and charges, counter charges and writs are flying.

In particular, we find increasingly, particularly in the Tenerife accidents, that whereas the flight crews are happy with the gold braid, the prestige and the high salaries which go with being the final authority in respect of their aircraft, suddenly there is a great clamour to shift the responsibility into the control centre or tower. Well, this is a time for reflection, a time for a controller to say to himself, or herself, "what are my responsibilities?"

Happily, I think we can dispense with the criminal law in this context quite briefly. Generally speaking a person can be guilty of a criminal offence if he acts contrary to the statute law of the land which makes his action a criminal offence. Or if he behaves by commission or omission with such a degree of negligence, or recklessness, as to have been totally unreasonable in assessing, or failing to assess the consequences of his action or inaction.

As far as air traffic controllers are concerned, just as the legal authority for the service you provide is well spelled out in legislation, so too may be other provisions against which you may be held to have transgressed in certain circumstances. For instance, in the United Kingdom the air navigation order includes the following provision, "a person shall not wilfully or negligently act in a manner likely to endanger an aircraft or any person therein". And a right and proper provision it is as I am sure you will agree, but although it has not happened (yet) it would seem that a controller could be held to be in breach of the order if he acted negligently.

I trust we can ignore any possibility of a controller wilfully hazarding an aircraft. What the legislation does not say is how negligent he must be to be considered in breach of the law. In the absence of case law it is probable that the common law definition would apply, that for a criminal offence to be committed the negligence must be gross negligence. This was established

by the House of Lords in the United Kingdom in 1937 in the following terms, "simple lack of care of such as will constitute civil liability is not enough: for the purpose of the criminal law there are degrees of negligence and a very high degree of negligence is required to be proved before the felony is established".
In practical terms, what does this mean to controllers? It means that simple errors of judgement however serious the consequences do not constitute a criminal offence, but gross dereliction of duty, such as playing cards instead of looking at the radar screen, or being drunk on duty, could well incur criminal liability whether or not this results in an incident or an accident. Of course, in order to assess the degree of culpability of a controller a Court would need to examine the intricacies of the ATC system and the controllers role therein in some detail.
The facets of everyday operations which are second nature to a controller may be anything but clear to a court. Imagine, for instance, trying to explain how you, "lost the picture" under pressure -
A clear enough concept for fellow controllers to understand but not so easy to explain in the cold analytical atmosphere of a Court of Law. I do not have to tell you that whereas it is impossible to cover the wide variations in legal practice which may effect controllers internationally recent events have shown that in certain countries a controller making an error under severe operational pressure has not been proof against conviction against a criminal Court.
But if the chances of a criminal charge being levelled against a controller are hopefully small the same cannot be said of questions of civil liability.
In terms of the anglo-saxon understanding of the word negligence, reduced to its simplest form, we are talking about the existence of a duty of care owed by the defendant to the plaintiff, a breach by the defendant of that duty and damage resulting almost directly therefrom.
Taking the existence of the duty for granted, how do you prove breach of duty?
This raises the question of what standard of skill is required in the first place? In law the standard required is that of a reasonable man, in ATC terms, of an averagely competent and proficient controller.
Thus, the fact that your colleague is well known as the "ace of the base" and could have handled the situation, whereas you, an averagely proficient controller,

became overloaded and made a mistake does not mean that you were negligent. However, should you find yourself unable to cope with the traffic situation which a reasonably proficient controller should be able to handle safely you are certainly not proof against a charge of negligence if you make a mistake however conscienciously you are attending to your task.
Courts have never accepted that a person doing his incompetent best could not be held liable. Proficiency checking systems notwithstanding, this is a fact which should be borne in mind by all controllers who find their control abilities in anyway impaired, perhaps by domestic, financial or family worries, or simply by advancing years.
There is a further fact here that I would like to emphasize. The requirement to exercise due care applies not only to airspace in which compliance with ATC instructions is mandatory, but also to the passing of any advice or information to aircraft. The standard legal work on the subject, Shawcross and Beaumont puts it this way:-

1. Persons exercising air traffic control are under a duty to take reasonable care in giving instructions, permission or advice, which the person to whom they are given is legally bound to obey or obtain and that they, and those responsible as their employers, would be liable for any damage caused by a breach of this duty.
2. They are probably under a similar duty and liability in respect of any instructions or advice issued with the intention that they should be acted on even if not falling within the categories of instruction which the recipient is legally bound to obey.
3. They are probably also under a duty to take reasonable care to give all such instructions and advice as may be necessary to promote the safety of aircraft within their area of responsibility and would therefore be liable for negligently omitting to give such instructions as well as for negligently giving incorrect instructions and advice.

And if that strikes you as being pretty all embracing it is!
Is rigid adherence to ATC manuals and instructions the answer? Well, not exactly. It is a framework within which to operate, they are neither all embracing nor totally exclusive. The opening paragraph of the U.K. Manual of Air Traffic Services states, "the MATS contains instructions and guidance to controllers providing air traffic services". However, nothing in the manual prevents a qualified controller from using his or her discretion and initiative in any particular circumstance.
In a number of cases in the United States, Courts have held that controllers' obligations to flight safety extends beyond mere adherence to instructions. So if you have already worked it out that they get you both ways, you are right! You are damned if you do and damned if you do not. In fact we are back to the concept of a reasonable man. Abide by the ATC manuals and instructions whenever possible and depart from, or go beyond such procedures only when you as a reasonable controller believe it is necessary to do so for reasons of flight safety.
If it were not such a tragic situation it could have been funny. I did not come here to sell books but listen to what the Judge in Yugoslavia said to Tasic in his closing remarks, this is quoted from my own translation of the judgement in the Zagreb case and appears in Zagreb One Four at page 166.

> "The accused could have refused the co-ordination in accordance with Annex 11, Article 3.5.2. and Article 3.5.2.2. of the same Annex...

Further, he could have asked the middle sector for the Mode Code of his own sector to confirm the identity of the plane and its height... But the main mistake was made at the moment when Tasic gave the DC9 permission to climb: that clearance was not in accordance with Annex 11, Chapter 3, Articles 3.3.1, 3 and 3.3.3. and contained none of the separation minimi stipulated in Annex 11, Chapter 3, Articles 3.3.4 1/ and 2/ a/ and b/.

It was quite astonishing, I thought, how selectively these departures from the rules were being used. The administration's own forbearance towards its ramshackle structure and precarious operation had been dressed up in rationalisations such as the "shortage of trained manpower" and the "stringencies imposed by economic reality": but if this judgement was about to offer any kind of comparable extenuation for Tasic there was certainly no sign of it yet.

There was, at this point, only the unanswerable charge that Tasic had not done what the rules said he ought to have done: it was a redoubtable cudgel which now belaboured him and it stirred enough dust quite to obscure such peripherals as the need to make life or death decisions in seconds, or trauma amounting to near-psychological collapse or any of the happenings which had brought Tasic to that pass.
It was all laid down.

> ...if Tasic wanted to apply longitudinal separation he had only to remember PKL, Chapter 4, Section 3, Article 402b which dealt with this situation thus: 'When JP550 reports overflying VOR Zagreb in the direction of Graz at 310 and BE476 crosses VOR Zagreb in the direction of Nasice ... and when both aircraft (are following) separate radials of VOR Zagreb, then the clearance will be given to JP550 to leave flight level 310 and climb to 350'.

It was laid down and it was a tidy solution to the problem of separation and Tasic - with all of 38 seconds in hand in which to conduct his dialogue with the imperilled JP550 - had not given any consideration whatsoever to PKL, Chapter 4, Section 3, Article 402b - or, for that matter, to the conditions of DOC 4444, Section 3, Article 3.1 which, of course, also laid down the correct vertical separation he should have imposed - 1000 feet for aircraft flying below 29000 feet and 2000 feet for those flying above that level...
He had been equally remiss in the matter of lateral separation since the correct procedure was covered by DOC 4444, Section 3, Article 7.2.1.3 and, for good measure, in PKL 410 (a) and (c).
But Tasic had failed in this, too: according to *those* rules he *could* have said that 'JP550 can climb to flight level 350 immediately, but it must cross flight level 330 before Kostajinica'. He would also, of

course, have had to ask the middle sector assistant whether JP550 would reach 330 before Kostajinica and this would all have been in accordance with DOC 4444, Section 3, Article 5.4 which stated that an ' aircraft could be cleared to change its flight level at a specific time, place and speed'.
But Tasic, who *could* have said this and who *should* have done that had not, in fact, said or done any of these things; and whatever he *had* done had been quite contrary to the provisions of PKL, Chapter 4, quite apart from his default in the matter of the aforesaid Annex, Chapters and Articles. Profusely studded as it was with equally mind-deadening references to DOC 4444, Chapter 10, 1.4.1.2./ 1.5.1.1./2/ and 3, the judgement continued its relentless catalogue of all the alternatives which had, seemingly, been open to the upper sector controller. He could have sent JP550 to flight level 320 and left himself with the option of giving further instructions as the traffic dictated. And, in any case, his clearance should have been precise, so that the middle sector controller could also have passed on a precise instruction."

Despite the often awesome responsibilities of ATC, it is unusual to find ATC negligence cited as the sole reason for an accident. The complimentary role of pilot and controller means that frequently the responsibility is shared, the precise apportionment of blame being for the Courts to decide. I know that this fact will not have been lost on you in Australia in recent years. Indeed, the interaction of the pilot's and controller's responsibilities can often be complex for, whilst the aircraft Captain is in command of the aircraft and is therefore responsible for the safe conduct of the flight, he may be required to follow ATC instructions. In such circumstances, he may deviate from those instructions only to the extent necessary to avoid immediate danger; it is then incumbent upon him to inform ATC of his actions, in order that the safety of his own or other aircraft is not compromised.
Although, in theory, the pilot's responsibilities for the safe conduct of the flight require him to satisfy himself of the safety of any ATC clearance, you hardly need me to tell you that in practice this may be quite impossible. There are many things the pilot cannot know, such as the whereabouts of other traffic in a busy en-route or terminal environment. Equally, there are other factors of which he can, and should, be aware, such as the proximity of high ground, although of course ATC takes on additional responsibilities in this regard when issuing radar vectors. So, what principles govern this interaction between pilot and controller? How does this overlap of responsibilities affect their legal positions?
In 1968, the question was considered by a Court in the U.S.A., and two important principles were laid down. Firstly, it decreed that whilst the pilot remained the final authority for the safe operation of an aircraft, he could only be held to be legally liable if he knew, or should have known, all the facts relevant to its safe operation. Secondly, the Court held that controllers have a responsibility to go beyond the requirement of their manuals in warning pilots of dangers apparent to the controller but not reasonably apparent to the pilot.
What this means in practice is that the pilot must keep a look-out, he must have read the relevant Notams, studied the instrument approach charts, be aware of his safety altitude and so on. Thus, if the runway threshold is temporarily displaced, and has been duly notified as such, the pilot should be aware of it; if there are mountains adjacent to the

approach pattern, the pilot should be aware of their existence. But other factors, such as the presence of unforecast severe turbulence, temporary works adjacent tc a taxiway etc. may be known to a controller but not to the pilot. If such factors have any bearing on the safe operation of the aircraft, it is not merely good ATC practice to advise the pilot, it's your legal responsibility to do so. If you do not, you may be held to be negligent in any subsequent Court action.

In view of the number of accidents which occur due to mountains claiming perfectly good and expensive aircraft perhaps I should dwell for a moment on the question of terrain clearance. Basically, the responsibility for maintaining adequate terrain clearance is the pilot's. There is only one exception to this rule recognised by ICAO, and that is when aircraft are proceeding under radar vectors from ATC. So, as a radar controller, the responsibility is yours when vectoring an aircraft; all other times it is the pilot's responsibility. In other words, a procedural ATC clearance to descend is permissive in nature; it means that there is no traffic to prevent descent to the specified level. Whilst the pilot is responsible for the navigation of the aircraft, it is his responsibility to adjust the descent profile if necessary to ensure he does not infringe his minimum safety altitude. Of course good ATC practice demands that normal procedures take terrain clearance requirements into account, and minimum levels on airways and in holding patterns are calculated accordingly. But, in the final analysis, the responsibility for maintaining adequate terrain clearance is the pilot's.

I think you will agree that the additional responsibilities carried by controllers whilst radar vectoring aircraft are fair and reasonable; there is little opportunity for a pilot, even with modern navigational systems, to be absolutely sure of his minimum safety altitude in such circumstances. But, if the introduction of radar marked the first "great leap forward" in air traffic control technology, so computerisation surely marks the second. And in conversation with controllers, I frequently hear doubts expressed as to the controllers' precise responsibilities and liabilities when operating in an increasingly automated environment.

Of course, controllers are not alone in their mistrust of computers. The excuse of "computer error", is rapidly becoming one o of the bones of modern life. But reduced to its basics, a computer or any form of automation, is only an electronic means of providing data or processing information either more quickly, more efficiently or in a different manner to that which would otherwise be necessary. Exactly the same can be said of radar itself, or even the use of radiotelephony or the Aldis Lamp. Essentially, I can see no difference between the legal situation of controllers in automated and non-automated systems. Of course, there may be specific requirements peculiar to the automated system, just as you have setting-up checks for a radar console. But when used in the laid-down manner, there is no reason why controllers should feel themselves vulnerable when relying upon automated systems for the display of radar or flight data, conflict prediction or any other function. If you use the equipment provided for you in the specified manner, and have no real reason to doubt that it is functioning correctly, then you cannot be held to be liable for a failure of the system. Of course, a major failure in a crucial traffic situation could result in the controller being faced with a situation which he cannot resolve immediately, but so too can a

simple radar failure. So, by all means continue to treat automated systems with a healthy degree of mistrust but do not be scared of them - there is no need for a permanent micro-chip on the shoulder!
Before I finish, there is one final aspect of the controller's legal position I would like to mention - that of security of employment. Of course, employment legislation is a specialised subject, and there are considerable variations from country to country. Nevertheless, there is one particular point of principle which relates to what I have said about negligence. If you make a mistake, however slight, can you be dismissed?
A few years ago in the U.K., a pilot with a small airline landed his Viscount rather heavily, causing the undercarriage nose leg to collapse. This occurred ten days after he had been assessed as "above average" by the training Captains. The airline dismissed him. The pilot took this case to an Employment Appeal Tribunal, but he lost, the Judge ruling as follows: -

> "In our judgement, there are activities in which the degree of professional skill which must be required is so high and the potential consequences of the smallest departure from that high standard are so serious, that one failure to perform in accordance with those standards is enough to justify dismissal."

It so happens that the case in question concerned an airline pilot. However, I do not need draw for you parallels with the situation facing air traffic controllers. It is perhaps a sombre note on which to end.

"Recipe for Refreshment"

by Eurospero

For about two years now, Eurocontrol has embarked on a programme of refresher courses for Air Traffic Controllers and ATS Assistants at the Eurocontrol Institute of Air Navigation Services in Luxembourg. Further courses are planned in addition to the management and data processing courses already available to ATC personnel. The following article outlines the impressions of a recent course participant.

Take twelve controllers of mixed nationality. Sprinkle them lightly with a dressing of lectures and simulator training. Keep them cooking gently with local wine and beer for two weeks in a warm Inn. Result - another Maastricht Refresher Course - no 7-UP!
For those who have already attended, this article may serve as a nostalgic reminder. For those with the pleasure still to come, it offers a foretaste. So whilst the memories are still fresh and the wounds not yet healed, here it comes:

For many of the course participants it was their first return visit since the basic training days, in some cases now more than twelve years ago. One could observe what the passage of time had done to both instructors and students. The once slim, athletic bright-eyed beginners had acquired some additional kilos of excess "biggage". Hairstyles were shorter with here and there a patch of "VMC on top" or a touch of grey. Spectacles were produced to assist with radar separation. Changed too was the

Kirchberg Plateau. Many new glass and concrete constructions have appeared on the sky-line, but the European Parliament still towers above the Chamber of Commerce, the European Investment Bank, the Court of Justice, the Computer Centre and the most recent addition, the magnificent Olympic Swimming Pool Complex. For a country with only 364.000 inhabitants, Luxembourg has a very high density of International Organisations, in addition to its 2587 square kilometers of forest.

After the introductory items, the course got under way with a review of procedural separation and radar procedures. This turned out to be something of an early shock for most of us to learn that, although in our daily work we were capable of separating the traffic, the particular rules of application were somewhat vague in some of our minds at least.

Other features of the first week of the course were a detailed insight into how tracking and radar data processing really works and what is happening and planned in Air Traffic Flow Management. Time was also devoted to case study and analysis of incidents. We divided into three groups and each was required to study the case, find the cause and produce procedures to prevent a reoccurrence of the incident. This competitive aspect provided some interesting results and the "experts" were quite willing to spend additional time on such cases, especially when they were related to our own geographical area.

An item which made considerable impact on the course was the film reconstruction of the Zagreb mid-air collision. Even for those who had seen the film several times before, still the emotional impact was quite overwhelming, with everyone inevitably identifying himself with the controller involved. "There but for the grace of God....." Perhaps it was seeing the gradual development of

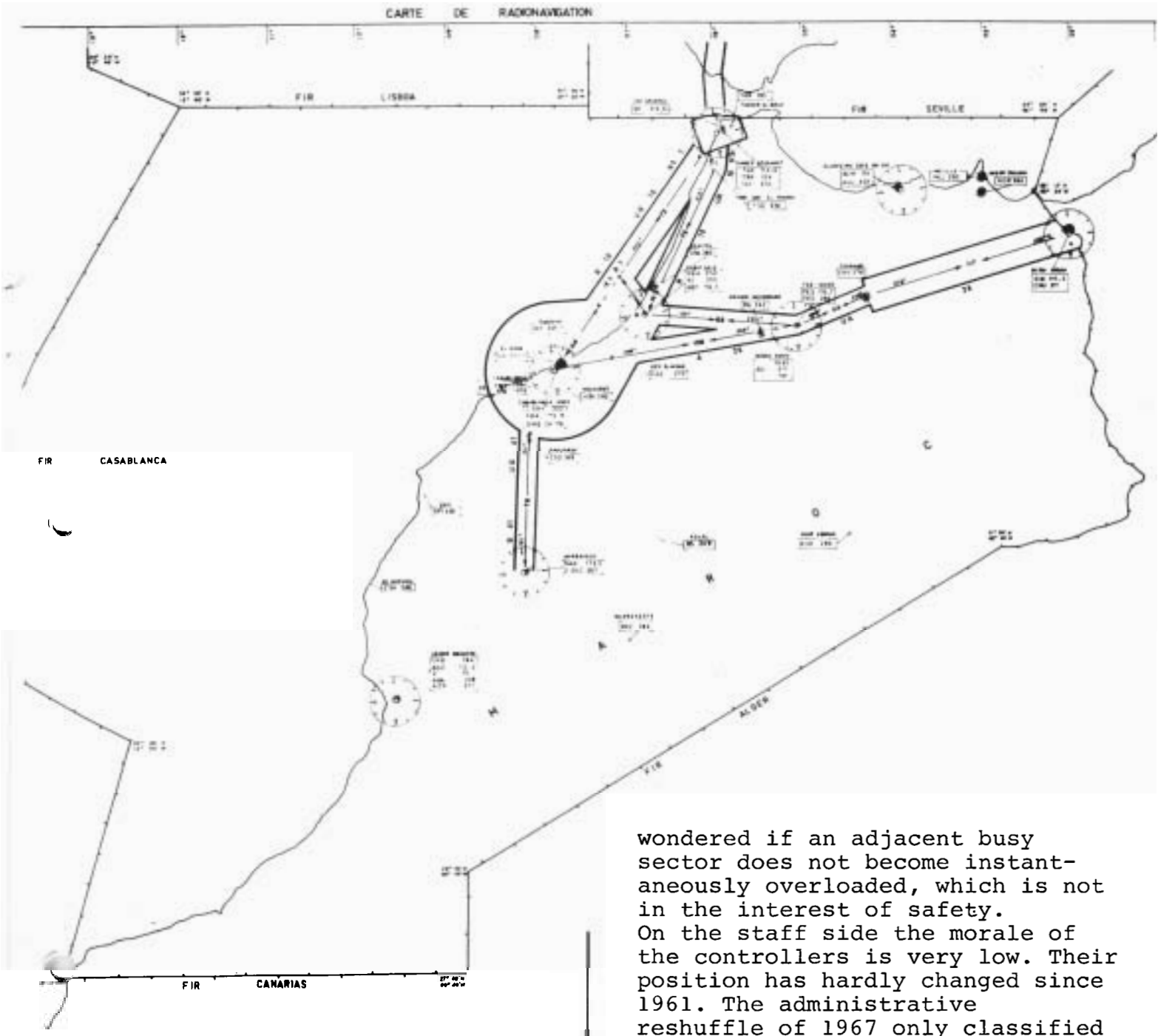
everyday events into an inevitable disaster, in the company of fellow-controllers, collectively sympathising with another colleague, that increased the emotional impact of the film. Whatever the reasons may have been, there was a unanimous adjournment to the bar at the end of the day to discuss further and to drown the sorrow. This exercise took longer than planned and seemed to require several repetitions....
The second week provided an opportunity for practising radar techniques and emergency situations in the unfamiliar environment of the Geneva airspace. It has been a critisism of this and previous refresher courses, that Eurocontrol staff would better benefit from a simulation of the Maastricht area. As a result of this, future courses will be based on the Brussels West Sector.
Following a review of SSR techniques, a glimpse of the future was provided by a film on the next generation of equipment, Discreet Address Beacon System (DABS) and Address Selective Secondary Radar (ADSEL). It is probably true to say that the carriage of Mode C transponders has been the most significant development as far as the controller is concerned, since the advent of radar. The eventual replacement of SSR by Mode S will probably be the next big step forward.
Of course La Vie Luxembourgoise has also a touch of La Dolce Vita. For the gastronomes, there are many restaurants offering seasonal delicacies with a wide variety of local and imported wines at very attractive prices. The well known European Club, Le Foyer, still serves as a rendezvous for visitors. Paul the barman has become a permanent feature of Le Foyer, always welcoming back Eurocontrol staff. If you draw a line on the map of the town, connecting Le Foyer to Holiday Inn and La Gare Centrale, you form a triangle. Now this is the equivalent of the Bermuda triangle - a most dangerous place for Europersonnel! A high risk area where, once inside, it is extremely difficult to emerge without a hangover! The so-called zero option.
There too one can meet such a variety of mixed nationalities and occupations. ATC types from all parts provide interesting encounters, especially of the third world kind. But who can be blamed for doubting that I once had a most interesting dinner of Indian curry with a female truck driver from Moscow. Hot stuff - that curry! On another occasion I heard two Dutchmen telling each other jokes in English for about half an hour before they discovered they were both from Holland. Yet another unfortunate who shall remain nameless, spent a whole weeks allowances in one downtown night! But I digress....
Another informative item in the course was an exposé on Incident Investigation. In particular, examples of occurrences within our own area were of immense value in that they demonstrated how a chain of individually unimportant items could combine to produce a potentially serious incident. There were lessons for all to learn especially the importance of clear concise phraseology both on R/T and telephone.
Rarely does a controller have the opportunity to meet the customer face-to-face, but the refresher course fills this gap. A captain from Britannia Airways gave a very interesting presentation about his Company Operations, Flight Management Systems and Fuel Economy Procedures. It was agreed that the time available for such interesting information was insufficient. A full day could be devoted to the subject matter and in addition, provide time for a pilot/controller dialogue.

Luxembourg offers an area of great natural beauty. The forests and rivers, flora and fauna combine in a magnificent way, but beware of the weather! Several of our course failed to return to the bosom of their families, due to a sudden heavy fall of snow on the Friday afternoon of the first week. This led to an unexpected run on the Luxembourg franc and on the cellars of the Holiday Inn.
On our last evening we gathered in a local restaurant to consume some excellent barbecued meat, suitably accompanied. We were lucky in having a Luxembourger on the course who contributed some useful local knowledge. And so the course terminated with the traditional debriefing, attended by the Head of Operations and a representative from Headquarters. During this session an attempt was made to offer constructive, collective critisism for the improvement of the course, for the benefit of future participants.
It had come to an end. It is a rare event for a group of controllers to agree, but there was a unanimous feeling that we had all benefited from the experience. Not only from the academic point of view, but in that we had shared more than a few laughs together. It is strongly recommended to future courses that to rendezvous in the evenings as a group, provides an opportunity for mutual understanding that is just not possible in our normal working environment, divided as we are by sectors, shifts and different tasks. By the time that this article appears in print, the next refresher course will be under way. May we wish them as much benefit and enjoyment as we had in our refreshment!

The Moroccan Situation

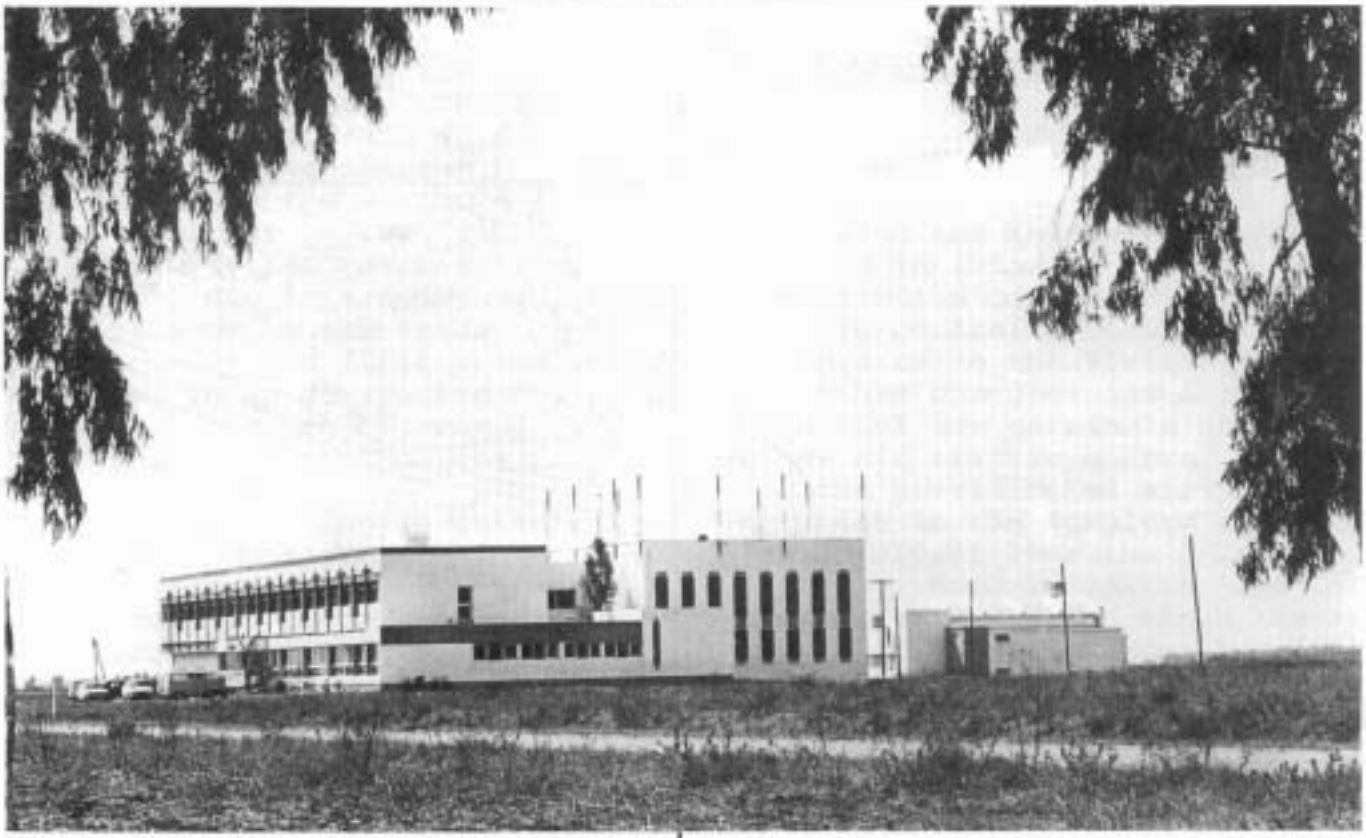
by Philippe Domogala

Following the independence of Morocco in 1955 and the installation of a civil air traffic control system in 1961, it appears to the visitor that a lot has changed: new airports, beautiful new terminals and even a new air traffic control centre for the provision of air traffic services in the complete FIR. But at closer look the paint is cracking, both in reality and figuratively. During times that the radar, the first one in Africa and installed in 1975, is in operation, one has to realize that no radar derived information will reach the controller; the antenna is kept turning only to prevent its bearings from rusting. The traffic is controlled procedurally and the dead orange coloured radar scopes only serve as a means to separate working sectors.
The workload in the sectors can become very high, especially in the coastal region, where all traffic originating from Europe and bound for the Canaries, South America and Western Africa is converging.



In addition the controllers face the problem of bad quality VHF frequencies. Despite remote stations and the apparent good structure, one can hardly hear an aircraft calling in on the frequency. During the days preceeding my visit to the centre, a 65 knots wind coming from the Atlantic had shaken some antennas, resulting in a breakdown of two frequencies out of four. All traffic of the corresponding sectors was transfered immediately to the remaining properly working frequencies, and it may be wondered if an adjacent busy sector does not become instantaneously overloaded, which is not in the interest of safety.

On the staff side the morale of the controllers is very low. Their position has hardly changed since 1961. The administrative reshuffle of 1967 only classified all technical personnel as "agents et adjoints techniques" without distinction in qualification. This meant that anybody performing a technical function in civil aviation was in the same grade and therefore received the same salary, which is rediculously low compared to the other airport employees (see index). The cost of living is increasing constantly, however salaries remain at the same level. In the past ten years only two salary increases have been granted; one of 5% in 1968 and one of 10% in 1981.



The air traffic controllers find their parking lot 12 km away from the airport, which is already 35 km away from Casablanca. The nearest building to the ACC is 10 km away. You can imagine that this will certainly not lead to integration of the controllers. In addition, whilst the new air traffic control centre was opened in 1972, canteen facilities were made available only in November 1981.

Some controllers have undertaken ATC functions for 20 years with only an ab-initio training course. There are neither continuation or refresher courses available. Motivation is so low that over 25% of the controllers left ATC for better paid and better recognized jobs. The Ministry of Transport undertook to improve the situation of the air traffic

SALARY COMPARISON

Position	Monthly salary in DH	Equivalent in US $
Civil controller	2000	320
Pilot Royal Air Maroc B727	20000	3200
Bus driver Air Maroc	2500	400
Bank clerk airport	4500	700
Check-in girl Air Maroc	3000	475

COST OF LIVING IN CASABLANCA

Rent of a three-room apartment	1500 DH
Rent of a studio	800 DH
Price of one litre gasoline	4,70 DH

controllers, but so far those promises have been turned down by both the Ministry of Finance and the Ministry of Public Service. Although the Moroccan air traffic controllers are in a better position compared to colleagues in other parts of Africa, we may conclude that there is much left to be desired. Moreover, considering that Morocco is one of the most developed countries in the African continent and that little has changed there, one can hardly expect any improvement in those other countries.

December 1982

Golden Flight Level 1983

by Artur Krahl

This year the European controllers' skimeeting, called "Golden Flightlevel", was organised by Milan ACC and held in Bardonnechia, a small village 80 km east of Turin near the French border.
Although we expected to depart with approximately 35 people, who promised to take part in this event, some were compelled to cancel and in the end a group of 22 was left. Jürgen Ellerman, appointed as team leader, started an ambitious campain to convince the rest of the group to travel by train via Germany instead of France, but luck was at our sides and we were able to make a last minute decision in favour of the most comfortable way of travelling, namely by air to Turin.

The meeting point of our racing and sponsor group was Brussels airport, Saturday 22.01.1983 - 1700. After check-in we learned that all bars at Brussels International Airport were closed, so we made the boarding completely sober. After take off and a first contact with the crew, we enjoyed our flight to Turin in a relaxed atmosphere. The night was spent in an hotel near the station, from where we continued our journey the next day with the Piemonte Mountain Express (the slowest train I ever experienced) to Bardonnechia. At the place of action we joined the other participants from Maastricht, who had arrived already one week earlier, as you can expect not only for training purposes. The hotel was shared with the teams from Geneva, Düsseldorf and Marseilles. During the following days we discovered the surrounding mountains and noticed that the snow conditions were poor to icy, which caused big problems to our skibeginners. Whereas Keès Scholts could manage these conditions with a private, 21 years old woman-teacher, called Louisa, Frans Gehl suffered damages from

a crash and had to be sledged down by two skiguards.
The poor snow conditions were amply compensated for by the sun, which we could enjoy for one week. Everyone became nicely sunburnt, except those who were hiding their faces behind bars all the time.
The evening before the race our team leader surprised us with a special dinner from the region, a kind of raw vegetables fondue, and the story went that two or three liked it.
This delicious meal was the last straw for Winfried Lumpe and his son. Because he also suffered a broken rib, he decided to depart the next morning. So we lost two excellent skiracers for the final competition the next morning.
At the day of the race we had to wake up relatively early, because some of us had low sequence numbers. Shortly before the start of the race my bindings broke and our team almost had to face another loss. A colleague from Rhein Control was kind enough to lend me his skis so that I would be able to take part in the race.

During the race a Fiat fighter saluted with splendid low overflights and acrobatics and during the lunch we enjoyed an excellent show of skydivers with their colourful parachutes.
Party and final ceremony were planned for the evening. An eight-course Italian menu, which lasted about four hours, made good for the vegetable menu of the first evening. At the endless awarding ceremony we found out that our hopes were greater than the result. The brilliant winners in sequence:

1. Marseilles
2. Geneva
3. Stuttgart

With the good feeling that we could force the Bremen team to take the last place, we departed the next morning and arrived safely at Brussels, Saturday 29.01.1983 - 1830. At this point I would like to thank Jürgen Ellerman and last but not least JéJé and Graziano from Milan ACC for their good organisation and nevertiring endeavour which made GFL '83 such a success.

(It leaked out to the editor that alcohol was available in quantity).

Fuel Economy

Airline Lingo Translated

Lately on a night duty, a Mac-ship from EDAF to LETO, requesting flight level 370, flightplan route Luxie - UA24 - etc., was cleared as follows.
Controller: "Climb to flight level 370, when passing flight level 245 set course direct to CJN".
Pilot: Read back the clearance and ended with "thank you very much".
Controller: "Is CJN the initial approach fix of LETO?"
Pilot: "Negative, the initial approach fix is 15 miles further southwards".
Controller: "Cannot do better at the moment"
Pilot: "Leave it, this is the best clearance received over Europe since 13 years".

don't forget (WRITE IT DOWN)

NEXT COPY DEADLINE MAY 25th