



INPUT

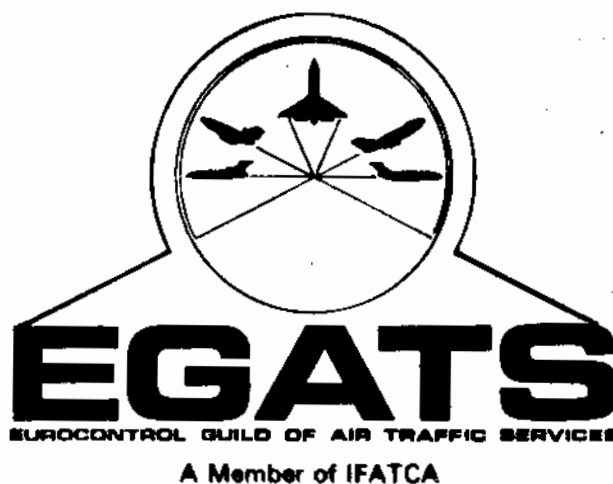


AUTUMN '80

INPUT

Postbus 47, 6190 AA Beek, the Netherlands

Bank :
AMRO Beek
Account 46.28.89.963



Output	3
President's Message	4
Guild Activities	5
Intercom	8
Tower of Babble	9
The Great Practice Crash	13
Controller Survey	17
In Flight Refuelling	18
The Hoop's Column	22
Expedite Clearance	22

Editor - Ian Guild
Assistant Editor / Advertising - Paul J. Hooper
Artwork/Layout - Martin Germans
Printer - Ben Cox

Unless otherwise stated, the views expressed in INPUT are not necessarily those of EGATS or the Editors.

No responsibility is accepted for personal opinions expressed in INPUT.

All contributions to INPUT are welcomed.

Subscription rate : f 3.-- per issue plus postage.

Output

Elsewhere in this issue is a summary of the replies sent on a questionnaire concerning stress and fatigue experienced by control staff. Some of the questions covered duty rosters, including the frequency of night duties.

The system that most of us work dates back to the dark days, or nights, of 1940 when the operators of the British Chain Home radar units chose to work an Afternoon followed by a Morning and Night on the same day; this system gave an almost unparalleled luxury of 1½ days off in 4.

Times change - those who were most vocal in pressing for the present system do not work in OPS anymore - and a revision to our duty periods is long overdue.

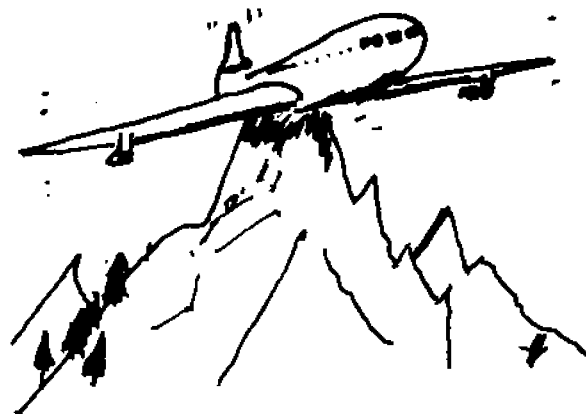
Pilots' duty hours have long been the subject of regulation, and rightly so. At 0700 local is it fair to subject them to the doubtful concentration of a controller who has essentially been on duty for almost 24 hours?

Having written the above I learned that moves were afoot to change the watch roster of the Brussels Sector Staff to the "temporary" roster worked by the Hannover Staff since they came to Maastricht - you may recall that this was the roster proposed by us some two years ago and rejected as there was a shortage of staff. Where the extra staff to man the increased number of positions now existing, and to replace those who have resigned in disgust at the apparent disinterest in our future expressed by management at all levels, are

to be found remains a mystery.

In any case it is well-nigh impossible to draw up a suitable "humane" roster within the constraints placed upon us by the conditions of service; it would be better if some thought and effort was first expended on revising these, as was proposed by our representatives two years ago, before altering the duty roster.

I.G.



"LADIES AND GENTLEMEN, THIS IS YOUR CAPTAIN SPEAKING. WE WILL BE REMAINING AT THIS ALTITUDE FOR QUITE SOME TIME."

Following my remarks concerning the inadequacy of the current seniority and promotion systems I was pleased to receive numerous comments from people concurring with my views. All very nice but what does it do? Even if everyone of us felt the same about the system, as individuals we are totally incapable of exerting sufficient pressure to bring about a review and possible revision. Only the staff representative body could pull that off. Food for thought, perhaps?

Staying with domestic systems, I fail to see why Eurocontrol employs security guards to spend considerable periods of their time raising and lowering a barrier to allow the passage of incoming and outgoing vehicles. From

my vantage point this would appear to be an unnecessary waste of man power and, quite often, an unnecessary harassment of staff members. Would an electronic keying system not provide a more efficient method of crossing the threshold to paradise ?

I note that the wonders of modern technology have so far failed to bring about an improvement in the medical reimbursement procedure. Computerisation, we were assured, would result in an expedited flow (!) of monies due, possibly within a week one knowledgeable person suggested to me. No! a hope ! Two months still appears to be the order of the day. I seem to recall being told that a computer is only as efficient as its operator (sounds good even if it's not true), therefore I can but deduce that it is the human element that lays claim to the dubious distinction of being the weakest link in this chain. So it is to those dear people that I impart that well-known Latin sentiment - *extractus digitum !!*

Only recently was the seriousness of wake turbulence brought home to me, aboard a Northwest 727 en route Orlando-Boston. We were in the initial stages of descent when the airplane lunged into a violent rolling movement to the left. The roll probably consumed no more than thirty degrees or so but was enough to make me realise that had it been any more violent I would have been in dire need of a change of underwear !

Only on consulting the captain after landing did I discover that wake turbulence had been the cause of my cardiac hiccup. Apparently we had descended through the wake of a Northwest DC10 which had been eight miles and also bound for Boston. Certainly it caught the crew off guard, which is hardly surprising as these demonic trails do little to broadcast their presence.

President's Message

The council of Europe - consisting of 21 European States - decided as well to support Eurocontrol, including the Maastricht UAC (see resolution elsewhere). What can go wrong, might be your question ? But we still have the "States within the States" (some national authorities), who will decide on our future.

Back to basics. Our main concern is the personnel problem. According to our management we have sufficient control staff. Why people have to do extra night duties and cannot take their requested leave is not understandable. A reserve in staff should be created. It is no solution to replace fully qualified controllers by trainees, as seems to be policy. The same mistakes have been made elsewhere. Talking about early retirement means talking as well about recruitment.

The Executive Board plans to have regular meetings with our management in order to exchange ideas and opinions. This of course can only work if we are primed with your requests and ideas and if our management has the intention to make use of the information we pass on.

Of course you have noticed that the ODS parts are coming in. The installation of this Philips equipment will be to the advantage of ourselves and our airspace users.

Guild activities for the last 3 months

EGATS - OPS

With reference to the uncertain situation about possible strikes in the Brussels FIR (lower airspace) for which no procedures were laid down we are glad to have found some instructions via an internal note (10.10.1980).

Procedures as laid down are clear. There is no possibility to send aircraft to airports within the Brussels area nor to LFQQ or LFST as coordination partners are not available.

From 3rd November for a trial period of three months the UR15 between LNO and MMD is not useable during some periods of the day. Authorities are aware of the fact that this may lead to delays and reroutings and a higher workload on the Luxemburg sector. Companies are informed by Notam. Procedures will be issued shortly.



From Brétigny we received information that they started a simulation about fall-back procedures in a stripless environment. At this moment they are trying to find a base for the procedures to be followed.

Short introduction :

Phase II of the MADAP Development Plan envisages the operational use at both executive and planning control positions of computer generated tabular flight data messages displayed on EDD's and aims at the elimination of printed flight progress strips.

The first step was made in Phase I when tabular flight plan messages were provided to executive controllers. It has however not been possible at this time to abandon the use of flight progress strips totally, due to the possibility of system failures.

The Eurocontrol General Directorate requested the EEC (Brétigny) to carry out a real-time simulation in order to assess a fall-back system to be used in case of a main system failure.

The initial part of the simulation will be carried out with EEC staff manning all positions.

The simulation will take place in two separate phases. The first phase concerns an "exploratory" simulation using EEC in-house staff only and is designed to master the simulation techniques as well as to provide preliminary results.

The second phase will take place later and will (possibly) involve the participation of Maastricht controllers.

Objectives :

1. To assess the possibilities of simulating a "degraded" performance of the MADAP system foreseen for Phase II.
2. To assess the minimum data required at control positions.

and functions to be performed by a radar and flight plan system in order to continue performance of control tasks during failure of the main system.

3. To assess the time period during which operations can be safely conducted with the minimum data provided and the reduced automated functions available.
4. To define procedures to be applied with "degraded" performance to maintain safe and orderly flight.
5. To gain experience for the EEC for future simulations.

The Brétigny Branch Board consists of :

President : J.C. Bouton

Secretary : R. Schaeffer

Treasurer : P. Slingerland

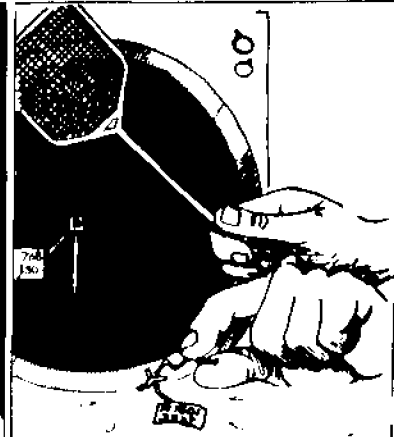
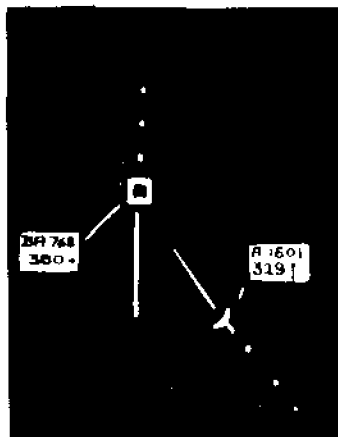
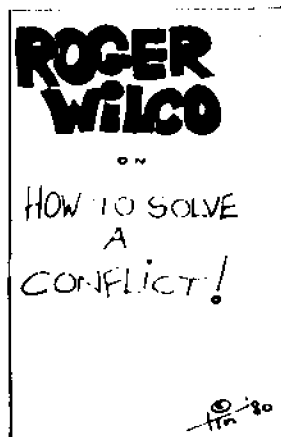
Zagreb Fund :

As requested at the last AGM the board is still trying to get the money back, which was transferred by IFATCA into another fund. After thorough investigations it is clear that EGATS was not informed about the change and has, after several letters with information

now sent a registered letter to the secretary IFATCA in which we demand the money to be transferred to our bank. We keep you informed.

A press release from the VNV (Dutch Pilots Association) has been received about the decision of several companies to choose for the Airbus A-310 with a 2 men crew (Forward Facing Crew Concept). The pilots do not agree with this for safety reasons, though their opinion is not asked. Looks like a typical management - personnel situation in aviation circles : "they will never learn" (INPUT Autumn 1978). As we read in the newspaper already the pilots consider possible actions, like work interruption.

The visit to EBBL of Wednesday 15th October was a success according to the people who went. Unfortunately the group was not bigger than some 15 members. Also the last beer call gave a poor result. Is it not necessary to organize anything anymore ?



WHAT IS HAPPENING IN MARSEILLE ACC ?

Every morning the same flow-control message comes : Restrictions overflying LFMM. Why ?

Are the controllers on strike ? Is their radar unserviceable ? Neither. The cause is a drastic shortage of controllers. Their management recognizes the immediate need of 70 extra controllers. Due to this shortage a new duty roster had to be introduced with 12 (yes, twelve !) teams of 18 controllers each.

There are 19 sectors at Aix-en-Provence. Due to personnel they can only open 12 of them. But at certain hours of the day they can only open 4 sectors. All this because between 7 and 8.30 in the morning only one team is on duty.

Out of a team of 18 the positions are divided as follows :
4 traditional on leave, 3 "retraits" (sort of input operator), 1 on the VFR sector (Marseille INFO), 1 supervisor, 1 chef de quart. That leaves 8 controllers. At 2 per sector (radar control. + Ass.) only 4 sectors can be manned.

The "Swing" shift comes only at 0830 (and stay until 1930) and this particular time bracket, between 0700 and 0800, coincide with the busy business flights of AIR INTER.

Immediate consequences : Restrictions to overflying traffic and extra work for us.

Now, before jumping to aggressive conclusions, just keep what follows in mind. Personnel here is diminishing every year and a day might come when we have to impose restrictions as well!

And when this day arrives, how would you like our adjacent Centres to react ?

PHILIPPE DOMOGALA

Note : Duty roster of Aix :
cycle of 12 days.
Official working hours are
32 h/week in winter and
36 h/week in summer.

DAY	1	2	3	4	5	6
	AFT	S	MOR	-	-	-
	1030	0830	0700			
	2100	1930	1230			
	7	8	9	10	11	12
	DAY	AFT	NIGHT	-	-	-
	0930	1230	-	0700		
	2000	2230	2000	-		

A report was received on the activities of the Professional Committee.

Numerous liason visits have been made to ATC centres with the intention of :

- obtaining statements from national ATC Guilds supporting the continued existence and the eventual expansion of Eurocontrol, that is to say, European Air Traffic Control on a European basis,
- to become familiar with the problems facing ATC on a local and national level,
- to use the information so obtained to stimulate a genuine, European approach to solving the chaos extant in ATC in Europe today.

To this end the information has been disseminated amongst members of the European Parliament, national legislature, pilot organisations and others.

Of the Centres visited it was only in Rome that a modern ATC system was to be found. Elsewhere poor equipment, poor labour conditions and medium to poor social conditions were the norm. Computer systems, where in use, are not compatible with those of neighbouring states and, again with the exception of Italy where ATC is being

civilianised, there seems little hope of any improvement within the foreseeable future unless a joint European approach is adopted.

It is hoped to provide further information on the Committee's activities in the next edition of INPUT, the report was received too late for inclusion this time around.

Intercom

Letters to the Editor

I would like to draw attention through the medium of your excellent journal to a problem which is becoming more urgent with ever increasing air traffic and the consequent increase in R/T communications. Though initiatives have been taken by IFATCA (the International Federation of Air Traffic Controllers Associations) with support from Pilot Associations, as far as I am aware the matter has not been pursued by international aviation authorities.

In areas of high density air traffic, fully serviceable two-way communication is the vital link in the provision of safety. Recently, air traffic controllers have drawn attention to the more frequent and frightening occurrence of this vital link being completely cut, by an airborne transmitter jamming the frequency, the crew of the offending aircraft being unaware of the problem they are causing.

It is not uncommon these days for

twenty or more aircraft to be under simultaneous radar control, with separation depending on radar vectors and/or rates of climb or descent. If loss of communication occurs in such a situation (and it happens) the consequences, apart from a rapid increase in the controller's pulse and sweat rate, are a loss of control service and cockpit confusion, as flight deck crews discover they have lost two-way contact with their current controller. To put it precisely - a potentially dangerous situation prevails.

Would it not be very much in the interests of safety in the air and of healthier controllers on the ground, if a solution of this problem could be found?

Two possibilities are offered for consideration to overcome the "left-on-transmitter" problem.

Firstly, a relatively cheap solution could be the provision of a visual lamp signal, on the microphone or elsewhere, whenever the aircraft's transmitter was activated. Alternatively,

automatic cut-out device of the transmitter, after a given time parameter, for example 60 seconds, with override facilities for use in emergency or for extended transmissions on company frequency.

Whatever the solution decided upon, some attempt must be made to ensure that aircraft do not collide because A.T.C. was unable to prevent it, due to a blocked frequency situation. Who from the Aviation Industry will take up this initiative in the provision of preventive measures, before another avoidable aviation disaster makes unwelcome news?

G.L. GILLET

(A copy of this letter was sent to "Flight International" for publication Ed.)

Tower of Babble

Reprinted from THE MAC FLYER



*I know you believe you understand
what you think I said, but I am not
sure if you realize that what you
heard is not what I meant.*

Did you know that the last time you talked to an ATC controller you used a specialized linguistic code based on elliptical syntax employed in a cognitive environment? Probably not, because that's how a communications researcher might define our ATC communications. In plain English it simply means the flyer and controller use a special vocabulary. The words are vehicles that carry ideas from one end of the communication link to the other and the most frequent breakdowns happen when they don't mean the same thing to all the communicators. Fortunately we agree on the meaning of enough words to keep air traffic moving reasonably smooth despite nonstandard phraseology and technical difficulties, but there is still an alarming number of problems.

A classic error of verbal perception, which is supposed to have actually happened, goes like this. On a missed approach the pilot of a many-motored transport gives the command "Takeoff power." His uninitiated copilot follows what he believes is the left-seater's instruction and promptly proceeds to take off power by pulling the throttles to idle. You can imagine the ensuing confusion of hands, power levers, and words.

- Ask the right question.

The complexity of ATC communications sometimes makes them susceptible to confusion even under ideal circumstances. Follow our next example carefully and see if you don't get perplexed just as the ATC controller did.

To set the stage, we need one controller operating departure control and two C-5 crews trying to satisfy some training requirements. The weather? It's strictly field grade VMC. There's a tacan on the air base and a vortac about 15 miles northeast.

Galaxy number one, Jumbo 11, is on the "go" part of a touch-and-go landing on runway 35 with clearance for a

right turn to 120 degrees and a climb to 4,000 feet for sequencing back into the PAR pattern east of the field.

A couple of miles behind Jumbo 11 is the second C-5, Jumbo 41, which has been cleared for the Fubar-5 departure at 4,000 feet after his missed approach from a visual pattern. Following the SID will take Jumbo 41 northeast of the air base toward the Lockness vortac.

Now enter the first villain: radio problems aboard Jumbo 11. The crew just can't raise the departure controller on the assigned frequency, so they maintain runway heading to the northeast and try several different channels. At the same time that Jumbo 11 finds a good freq, Jumbo 41 is also calling the controller on his assigned channel.

The controller tells both Galaxy crews that he has radar contact and tries to sort out the blips on his scope by reporting "Jumbo 41 is four miles north of the air base tacan."

Actually, Jumbo 41 has barely finished the missed approach and it's Jumbo 11 that's four miles north of the base, but the pilot of Jumbo 41 gives the controller a "roger" on the radar position.

Eager to start their radar approach, the pilot of Jumbo 11 reminds the controller that he is maintaining runway heading and 4,000 feet. The controller promptly reclears him for a right turn to 120°. This Galaxy is now about six miles north of the airport at 4,000 feet, and during his turn he will cross the 210-degree radial of the Lockness-vortac.

The controller is starting to feel insecure about his identification of the radar targets and tells Jumbo 41 "Your position is seven miles west-southwest of the Lockness vortac."

This is about where Jumbo 11 is turning to the southeast, but the pilot of Jumbo 41 responds "Roger, thank

you". Meanwhile Jumbo 41 starts a right turn to intercept the 030-degree course inbound (the 210° radial) to the Lockness vortac. The controller instructs Jumbo 11 to turn right to heading 170 for downwind.

As both giant airlifters roll out on their new heading, the pilots spot their converging paths and take evasive action. They later estimate the miss distance at 500 to 1,000 feet.

Although the above narrative points a finger at the controller for nearly radar controlling a massive midair, the aircrews were also at fault for positively acknowledging incorrect radar position reports.

There was an easy way out of his situation for any one of the three actors - a straight question. If the controller had simply asked "Jumbo 41, I show an aircraft four miles north of the air base vortac. Is that your position?" he probably would have resolved the identification problem. On the other hand, if one of the aircrews had asked the controller to check their position report because it didn't match the cockpit indications, then the situation could have been quickly corrected.

One of the most often misunderstood clearances is an altitude change. Aircrews routinely read back the altitude they've been cleared to and count on the controller to catch any error. Here's an example where one controller caught what others had missed.

Inbound to an overseas base, Airevac 108 was cleared from 13,000 to 9,000 feet and the pilot requested a PAR approach. Passing 11,000 feet the flight was cleared on down to 3,500. The crew properly acknowledged all the clearances. As the altimeters showed 7,000, the crew was told to contact approach control. Airevac 108 checked in with approach and was instructed to turn right to 270 and

maintain 3,500. The pilot read the clearance back "Two-seven-zero and twenty-five-hundred for 108."

The controller responded "One-zero-eight, affirm. Pilot's discretion perform landing check." At this point the C-9 was handed off to the PAR controller.

The final controller noticed the radar target approaching the glide path from well below and asked Airevac 108's altitude. The pilot told him that they were level at 2,500.

"Airevac 108, climb immediately and maintain 3,500, turn heading 360", was the controller's reply. The crew had descended to an altitude about 500 feet below the published safe sector altitude without questioning the clearance.

Their 270-degree heading had them pointed toward the mountains just west of the field.

The C-5 crew was fortunate because the weather and visibility were good; the C-9 crew, because a controller was alert. As you can see, though, misunderstanding an ATC clearance could easily have had deadly results in either case. The Learjet in the following episode wasn't so fortunate.

Before taxiing out, the crew picked up their IFR clearance: "Cleared to the Las Vegas Airport, as filed, via Palm Springs, direct Twentynine Palms, climb and maintain seventeen-thousand....."

Following this clearance, the biz-jet would normally have turned to the northeast after takeoff and proceeded safely on to Vegas. However, just before departure, the controller made a change "Lear maintain niner-thousand, cleared for takeoff."

The Learjet pilots were used to the radar environment where such altitude restrictions are often coupled with "maintain runway heading and contact

departure control." The weather was IMC and the controlling agency sounded exactly like a radar facility, but Palm Springs has no radar. The controller expected the Learjet to take off and turn right while climbing to 9,000 feet, an altitude well above the MEA along their proposed route.

After the Lear departed, the controller asked them to report crossing the Palm Springs 051 radial at 10 DME. (Technically this constituted a route change, but it was not transmitted as such.) A few minutes later the pilot reported "crossing the radial" and "approaching 9,000 feet." The Lear continued on its northwest heading for what must have seemed like an eternity before the pilot finally asked "Where are we going after this; we're maintaining 9,000 feet on heading three-one-zero?"

Without radar this was the departure controller's first chance to relate the departing jet's position to the mountains northwest of the airport. He didn't catch the significance of the reported heading because he was busy trying to sequence the mini-jet with two arriving airliners.

We'll never know why a highly experienced pilot, who was familiar with Palm Springs, chose to blindly hold his northwest heading and maintain 9,000 feet (4,000 feet below the safe sector altitude). But seconds after the Lear-jet's data block flashed onto L.A. Center's radar, the small jet lost a confrontation with the greatest granite giant in the area.

Francis H. McAdams, NTSB member, wrote this statement in support of the Board's findings concerning the Learjet crash: "This accident occurred in my opinion, because of nonstandard and nonprofessional clearance and transmissions on the part of both the controller and the pilot. If the proper language had been used, the accident would most

likely not have occurred."

- Okay Already

So far we've stressed direct questions and plain language regarding radar positions and clearances to insure that everybody is on the same wavelength. Here's an example of how one simple, short, everyday word can botch up air communication. That word is "OK" and according to the dictionary, these initials of the native village of Martin Van Buren have come to mean approval or agreement. The meaning is too imprecise for ATC communication however.

Why? Okay, let's look at a possible misuse of the term. Suppose you're tooling along in your Lockheed aerospace vehicle at an intermediate altitude and you ask the controller for a climb to your cruise altitude. You're eager to get on up to your flight level because it's going to be a long trip and you need to conserve fuel.

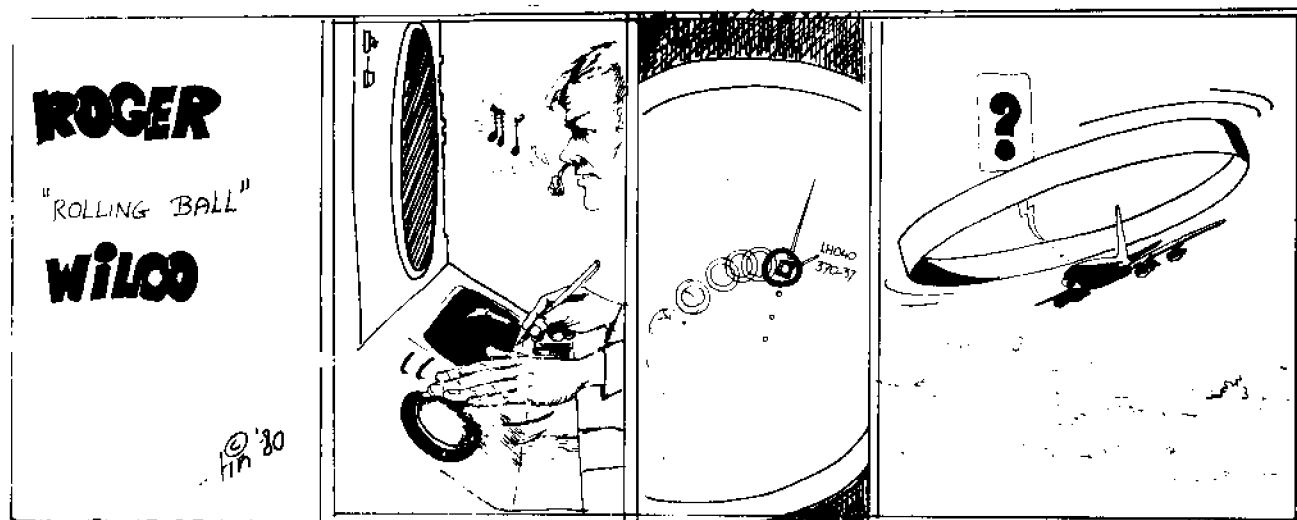
The controller comes back with "Okay, standby."

Somehow you miss the "standby" part and believe that it's okay with the controller if you climb, so you

start up. As soon as the ARTCC computer alerts the controller to your altitude deviation, you're in for an interesting discussion - at least. So who's to blame? Both the controller and you. The controller shouldn't have used the nonstandard terminology, but you shouldn't have climbed without a correctly worded altitude clearance. Okay just isn't okay when it comes to air traffic communication.

Good communication requires patience, prudence, and charity. Have patience when you don't get an instant answer to your last carefully planned transmission. Hostility never expedited a clearance. Exercise prudence before pressing the mike button - don't butt in on the party line. Charity is not being overly critical of someone else's radio faux pas. Remember when you had trouble thinking, flying, and talking all at the same time - perhaps not so long ago.

Efficient communication is a matter of both skill and attitude. The goal is to get the people on both ends of the communication hookup to understand each other. Being in electronic earshot of another person doesn't always bring your minds into contact and understanding - you have to work at it.



The Great Practice Crash



This tale is true. Only the names have been altered to protect the survivors, and also to protect myself.

In the year of our Lord 1966 at the international airport of the Kingdom of Radnab, a small, rich, sunny and restful country many leagues to the

East, it was decided by the lords and masters of civil aviation that a great practice crash should be held. The Ides of March was considered a suitable time of the year, there being less likelihood of rain falling to douse the flames and thus ruin the sport. The exact reasons for the great crash practice remain obscure to this day. Some say it was held to celebrate the coming of the God of Fire so many years before, unto the unsuspecting, uncaring, and until that time, largely nut-eating vegetarian masses. Others say that the event was to celebrate the later coming of the Rain God, necessary to extinguish the many fires which plagued the unhappy hordes, burning to the ground many straw huts. The legend has it that the chief finally lost his sense of humour on the night the conflagration consumed the royal toilet, and the royal court in sitting within was thus caused to exit hastily without, as it were.

The cynics speculate that the whole exercise was caused to test the effectiveness of the country's fire services should a major aircraft disaster occur upon their territory. This theory, whilst at once lucid and indeed logical, must be disregarded by the serious historian. There existed no doubt whatsoever about the effectiveness of those fine men. There was but one small flaw in the training of these men, they had yet to meet a fire. It must be emphasised that this was through no fault of their own. They could not be said to have any control over the capriciousness of fate and an unworthy aviation community not possessed of the decency to crash on their territory. Indeed those valiant fire-men had many times kindled a fire on which to practise their skills, but the rain always extinguished it first. Yes my lords, such was the sorry fortune of those gallant men, the weekly hour of rain would always arrive in the nick of time.

The planning of the Great Practice groaned inexorably on. Fears of cancellation or forgetfulness were dashed, when there arrived a set of

asbestos fire rescue suits "airfield crash crews for the use of". These magnificent outfits were a delightful silver colour and fully enclosed the wearer, protecting him up to temperatures arrived at by the formula $n^2\phi + 32(xy^290) - 8d$, where ϕ remains constant. The subsequent course in algebra delayed the event by some months, until the formula was abandoned in favour of the new formula $v + h$, where v =very and h =hot. Other symbols were inevitably postulated to replace the "v", but all were dropped as either obscene or unsuitable for the family audience anticipated at the great event.

The plan formulated was elegant in its simplicity. Six hundred gallons of aviation fuel would be ignited by means of a signal flare fired from a safe distance. On seeing this a person in the control tower would immediately telephone the town fire-station and pass the message "Practice crash, on the airfield, map reference" The town fire service would then proceed with maximum rapidity to the airfield. The Duty Air Traffic Controller, on observing the approaching vehicles, would press the airfield crash alarm thus alerting (the cynics would say awakening) the airfield crash crew, who would storm from their lair as noisily as possible and commence extinguishing the fire. The town fire services would then arrive within seconds and assist. The fire would be out within twelve minutes.

At last the great day dawned, brilliant in sunshine. Official weather report : QFE 1010, 1 okta at 10,000 ft. visibility unlimited, no wind. The spectators gathered, and the dignitaries ensconced themselves in the control tower. Coffee was served, and count-down commenced.

Zero ! The flare was fired, alas it missed. The second flare was fired, but by some miracle of combustion failed to ignite the fuel. Enter our Hero who, noticing that the unfortunate soul charged with causing the inferno was about to use his initiative and employ a match, immediately had the presence of mind to place a bet with the DATCO

as to the likelihood of this genius' survival. Hilarity as the flames surged forth in an effort to consume the luckless soul, and applause as he escaped. Our Hero counted his losses.

Following the meticulous plan our Hero now grasped the telephone and with a flourish dialled the appropriate number, and waited. He waited. He waited yet longer. At last he hung up and placed his bet with the DATCO as to the possibility of the arrival of the town services. Dialling again, cool in anticipation of rewards to come, our Hero's hopes were once more thwarted as a subdued and somewhat suspicious voice was heard in reply. The ensuing dialogue is best rendered verbatim :-

VOICE (subdued and suspicious) :
Hello.

HERO (confidently) :
Hello. Practice crash, on the airfield, map reference

VOICE (subdued and suspicious) :
Hello.

HERO (less confidence but cheerful) :
HELLO. Practice crash, on the airfield

VOICE:What you want ?

HERO :Pract.....

VOICE:Hello. What you want ?

At this point our Hero, almost counting his winnings, enlisted the aid of the DATCO who, taking the telephone endeavoured to explain to the unlucky voice the purpose of the call. In the background the fire blazed merrily in the morning sunshine, as the airport crash crew optimistically commenced a game of the local game "Raga".

The DATCO after attempting to explain why it was not necessary to give his name and address, returned the telephone handset to its cradle with some disregard for its fragility. The DATCO then proceeded to telephone the Head of the country's fire services, in order to request, as soon as convenient, the attendance of his units. Having obtained assurances of immediate cooperation, the DATCO then

proceeded to dance, gesticulate and sing in a manner reminiscent of the courting procedure of a rampant bull.

At last could be heard the thrilling call of a dozen sirens as the approaching fire engines came into view. Down the road at hectic pace, through the airport gates

At this point our Hero pointed out that the DATCO should have pressed the airfield alarm button some minutes previously. The DATCO immediately pressed said button and calmed down sufficiently to watch the fun. Out roared the engines of our gallant crew (to the rescue lads!), straight into the path of the town services. The ensuing chaos was wonderful to behold, as each appliance struggled valiantly to miss the others. At last the now scattered vehicles rallied and proceed to the inferno.

The airfield crash crew, resplendent in their silver asbestos, charged at the blaze to snuff it out at its very core. They then thought better of it and retreated. In the control tower our Hero, recovering with some difficulty from his hysterical laughter, glanced at the tear-stained face of the Senior Air Traffic Control Officer who - grief stricken - had not the heart to watch.

Repeated attempts by brave superiors achieved no success in convincing the firemen of the efficiency of those silver suits. Only one stout fellow, their leader, ventured forth but was repulsed when it was found that he had forgotten his fire extinguisher in the excitement.

The fire raged for three hours, spluttered for three more, and finally smoked itself out in two days. Surely a brilliant achievement.

These days all at Radnab is decidedly different. Efficiency reigns supreme at the modern international airport. But those pioneering days of long ago will ever be remembered. As I found during my visit last year, the legend of the Great Practice Crash will never be extinguished.

Controller survey/ opinion poll

SYNOPSIS OF QUESTIONNAIRES ON FATIGUE, SICKNESS AND STRESS.

The control staff of U.A.C. Maastricht responded to the U.S. questionnaire with their usual apathy - only 26 controllers bothered to return one ; no expense, and very little time was involved.

RADAR POSITIONS - onset of headaches, nausea, fatigue and even fear (severe stress ?) was noted, usually after $\pm 1\frac{1}{2}$ hours of moderate/heavy traffic. After a strenuous afternoon duty, sleep was often not possible for up to 3 hours after the duty, and then it was disturbed sleep.

REMEDIES SUGGESTED - less continuous work, more breaks and available staff, a smoother traffic flow.

PLANNING POSITIONS - There was a lower incidence rate here, but on our busiest sector, Brussels-West, symptoms similar to the radar controllers' were experienced.

PHYSICAL PROBLEMS - One controller had trouble sitting (hemorrhoids?) and requested better chairs, not plastic covered.

NIGHT DUTIES - All working positions have a high incidence of fatigue and nausea, plus some uneasiness ('stress'), particularly towards the end of the duty, which has always been preceded by a morning duty on the same day, with an early (07.30 L) start. Several people mentioned that they slept badly before the 'M' duty, so that by the end of the 'N' duty, they were really short of sleep in the past 36 hours.

SUGGESTED REMEDIES - Senior

controllers (* 40 years plus) should not do night duties, and nobody should do "M/N" on the same day : this was felt to be dangerous, especially towards the end of the night duty, when fatigue is greatest, and traffic load increasing.

The point was made that the single night duty did not allow the bio-rhythm to settle, and a continuous sequence of 10-14 consecutive nights was suggested.

R.G. EVANS

In-Flight Refuelling

When we receive an estimate on a tanker flight on its way into one or other of the refuelling areas I wonder how many of us ever wonder how this practice began.

On 1 July 1935, a tiny Curtiss Robin monoplane landed at Meridian, Miss., in the U.S.A, after being airborne for four weeks. Flown by two brothers, Al and Fred Key, the aircraft had taken off from Meridian on 4 June and had remained in close proximity to the airport for most of the 653 hours and 34 minutes of the flight. During that time, 400 contacts were made between the Robin and a supply aircraft in order to transfer fuel, oil and food.

This flight was a dramatic, if somewhat impractical, demonstration of the possibilities for refuelling an aircraft in the air. No-one was likely to want to stay aloft for a month at a time for any purpose other than a stunt : but the expanding commercial application of the aeroplane during the 1930's created an interest in any

means of increasing the non-stop range over which a useful payload could be carried. Refuelling in flight was one of those means.

Range, of course, was a function of the fuel capacity of the aircraft and the rate at which fuel was consumed by the engine(s). Fuel capacity, in turn, was limited by the maximum weight at which the aircraft could take off. Greater take off weight required either more engine power (with comparably higher consumption), greater aerodynamic efficiency (limited by the "state of the art" at any given point in time) or longer take off distances (limited by the lengths of runway available). Today, improvements in the propulsive efficiency of modern jet engines, aerodynamic refinements and extended runways at most of the world's major airports have combined to allow the development of aircraft which have enough non-stop range for virtually all the needs of modern airlines. But in the period up to the outbreak of war in 1939 and in the few years after its end, commercial requirements had stepped ahead of engineering achievement and alternative means of increasing range were tried. Then, as now, it was the non-stop trans-Atlantic air routes which represented the prime objective for new developments. Flight refuelling, although the most promising of the various techniques tried in this period, was the most difficult to perfect. It required the use of a "tanker" aircraft with which the "receiver" aircraft had to rendezvous ; a connecting hose then had to be passed between the two aircraft while they flew in close formation for as long a period as was necessary for the fuel to be transferred. The possibilities were first demonstrated in 1923 in the USA, but it was not until 1936 that serious attention was given to adopting the technique for commercial use.

In 1936 a company named Flight Refuelling Ltd. was founded in Britain to continue development of the system which had been patented by Flt.Lt. R.L.R. Atcherly after watching

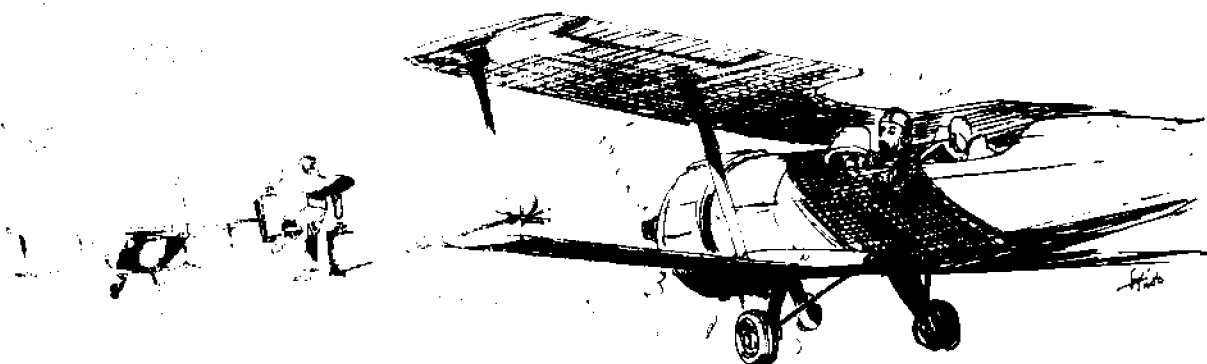
demonstrations in America. With support from the Air Ministry, Flight Refuelling Ltd. modified a series of large aircraft, including two Vickers Virginias, the Armstrong Whitworth A.W.23, the Handley Page H.P.51, the Vickers B.19/27 and a Boulton Paul Overstrand, to demonstrate the receiver/tanker technique.

The demonstrations with these aircraft showed that flight refuelling had reached the point where it could be considered seriously for commercial use. At this time, in 1938, Imperial Airways was committed to the use of flying-boats for a scheduled service carrying mail between Southampton and New York. After a series of demonstrations in which the A.W.23 tanker refuelled the Short C class flying-boat "Cambria", Flight Refuelling Ltd. received a contract to provide a refuelling service for the scheduled operation - the world's first use of the technique as routine.

The "ejector" method which had now been developed by Flight Refuelling required the receiving aircraft to trail a weighted line. The tanker, flying slightly to one side of, and behind the receiver, fired a second line across the receiver's line, which then became

gripped in the paws of a grapnel. The tanker then winched in the linked lines and attached a hose to the receiver's line, which was then, in its turn, pulled back into the receiving aircraft and the hose then connected to a refuelling valve. Fuel was then transferred at an average rate of about 100 gallons (455 litres) per minute.

For normal operations the C class boat was cleared to take off at 48,000 lb. (21,770 kg) gross weight. Special clearance was obtained for operation at a flying weight of 53,000 lb. (24,040 kg), so that about 5,000 lb. (2,270 kg) more fuel could be taken on shortly after take-off for the Atlantic crossing. Two of the Short C class boats "Cabot" (G-AFCU) and "Caribou" (G-AFCV) were modified for the service, and the latter took off from Southampton on the first scheduled mail flight on 5 August 1939. A ground refuelling stop was made at Foynes, now better known for the airfield Shannon, and shortly after take-off from there the Caribou was refuelled in the air by one of four Handley Page Harrow tankers that had been specially converted for the purpose. A similar refuelling was made of the



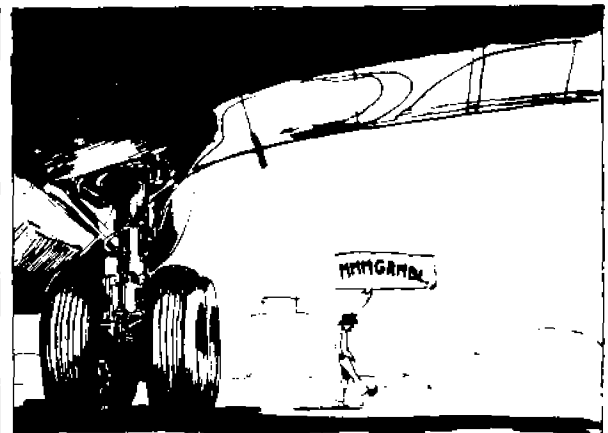
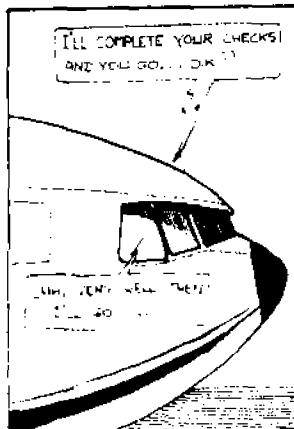
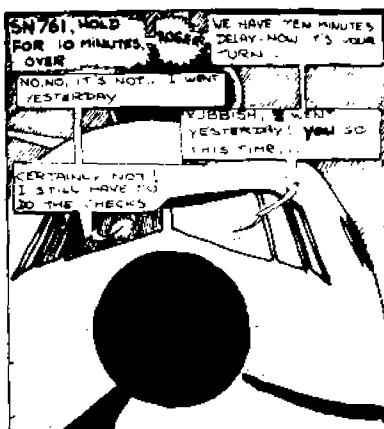
Newfoundland coast after the take-off from Botswood on the return flights.

The Imperial Airways trans-Atlantic mail service was doomed to be discontinued within a month because of the outbreak of war - but sixteen crossings were made and on all but one (when favourable winds made extra fuel unnecessary) successful refuellings were completed.

An interesting alternative to flight refuelling had also been studied by Imperial Airways for the North Atlantic operation at the suggestion of Major Robert Mayo - Imperial Airways' technical adviser. The idea was for a "mother" aircraft to take off with a smaller, heavily-loaded aeroplane on its back and to launch this when cruising altitude and

speed had been reached. Such 'pick-a-back' aircraft were not new in concept but had never been considered previously for commercial operation. Short Bros, backed by the Air Ministry, proceeded to design a suitable pair of aircraft in 1935. The object being to produce an air-launched seaplane which would have sufficient range to cross the North Atlantic after launch. Flight testing of the Short-Mayo Composite began early in 1938 and the first Atlantic crossing was made by "Mercury" on 21 July, non-stop to Montreal after being launched off Shannon.

For various reasons Imperial Airways never operated the Composite on a regular service, but the potential of the project was demonstrated in 1938 when "Mercury" was launched by "Maia" near Dundee, Scotland, and completed a record-breaking flight



for seaplanes of 5.998 miles (9.652 km) to the Orange River in South Africa, which stands to this day.

Whilst Imperial Airways was looking towards a North Atlantic service France and Germany were devoting their attention to the shorter South Atlantic route. With air routes established from Paris to Dakar, in West Africa, and also down the east coast of South America from Natal to Buenos Aires, the French company Aéropostale relied upon a ship for the sea crossing between Dakar and Natal for a mail service opened as early as 1928. After Air France took over the operation aircraft were developed to open a through mail service in 1936.

The German line, Deutsche Luft Hansa, similarly used ships to carry mail between the Canary Islands and Fernando de Noronha from 1930 until 1932, when the first of the unique seaplane depot ships came into service to provide refuelling services for a Dornier Wal flying-boat used for the trans-Atlantic sector of the journey. The technique required the flying-boat to land alongside the ship; it was then hoisted on board, serviced, refuelled and launched by catapult. Accelerations of about $4\frac{1}{2}g$ made the technique unsuitable for passenger-carrying, but the service was operated successfully right up to the outbreak of war in 1939 at a frequency of about two round trips a week.

The German operations in the South Atlantic were actually preceded by some experimental mail-carrying flights in the North Atlantic which also used catapult launches. The first such operations were by a Heinkel He 12 seaplane launched from the liner "Bremen" when still some 300 miles (480 km) out from New York on its maiden voyage. On the return journey aircraft were similarly used to save about 36 hours on the time taken for the mail to reach Germany via Cherbourg. The technique became

standard on the "Bremen" and later on the "Europa" using a Heinkel He 58 and/or Junkers Ju 48.

In September 1936, DLH began trials across the North Atlantic based on the depot ship technique. Two Dornier Do 18 flying-boats flew a number of Berlin - New York trips with refuelling stops alongside "Schwabenland" in mid-Atlantic. A year later two Blohm und Voss Ha 139s made a series of twelve flights from the "Schwabenland" steaming off the Azores. No scheduled flights were possible, however, as Germany was unable to negotiate traffic rights with the USA.

Following the end of the war in 1945, the possibilities of flight refuelling were again investigated using Lancaster and Lancastrian tankers, and Lancaster and Liberator receivers. Trials were made over the English Channel (1946), the South Atlantic (1947) and the North Atlantic (1948) with few operational difficulties; but by this time aircraft with adequate range for trans-Atlantic operation were becoming available and subsequent interest in flight refuelling concentrated on its military aspects, more of which at a later date.

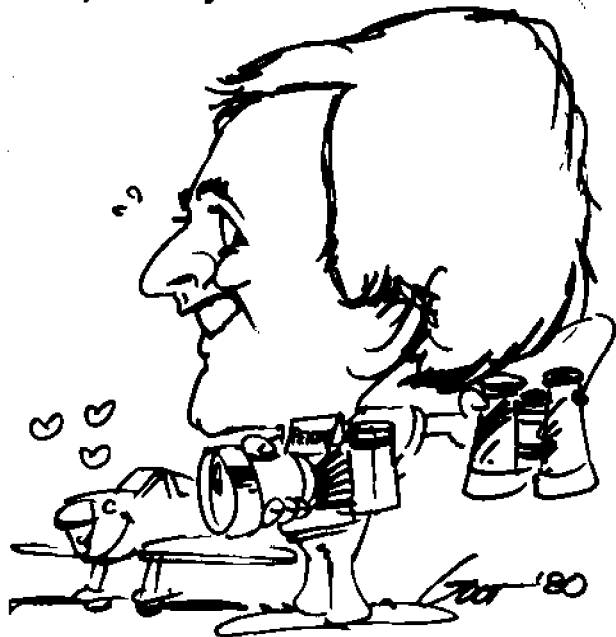
Adapted from "Stretching the Range" by Gordon Swanborough.

Closing date for next

INPUT

December 10th.

THE HOOP'S COLUMN...



The HOOP has decided to rest his pen for this issue thereby allowing others the opportunity to exercise their literary talents ! He has threatened to return for the next issue though. Can't be lucky all the time can you ?

Expedite Clearance

Late News

I have received word from Mr. Dieben that for a number of reasons it was not possible for him to comment on the article on promotion in the last INPUT. He has however agreed to an interview on this subject in time for the next edition.

[Handwritten signature]

FUN IN THE COCKPIT ?

Some time ago Field 18 of the flight plan of an aircraft operated by the American FAA contained the following gem:-

LOCAL SEX FLT CHECK

Which led to the following query:-

PLS CONFIRM FIELD 18 ACTIVITY

And the response from Frankfurt:-

WILL CHECK SEX AFTER DEPARTURE FROM EDAF FOR 30 MINUTES

They tell me SEX is a PAR but I'm not wholly convinced.