INPUT — 1987-1

JEPPESEN 6 DEC 85 (11-1)

MAASTRICHT, NETHERLANDS

ZUID LIMBURG

ILS Rwy 22

LOC 108.5 BK

Apt. Elev 375'

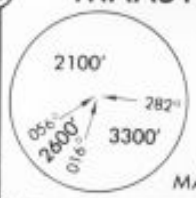
*ATIS 124.57 VHF/DF

*BEEK Approach (ASR) 123.97

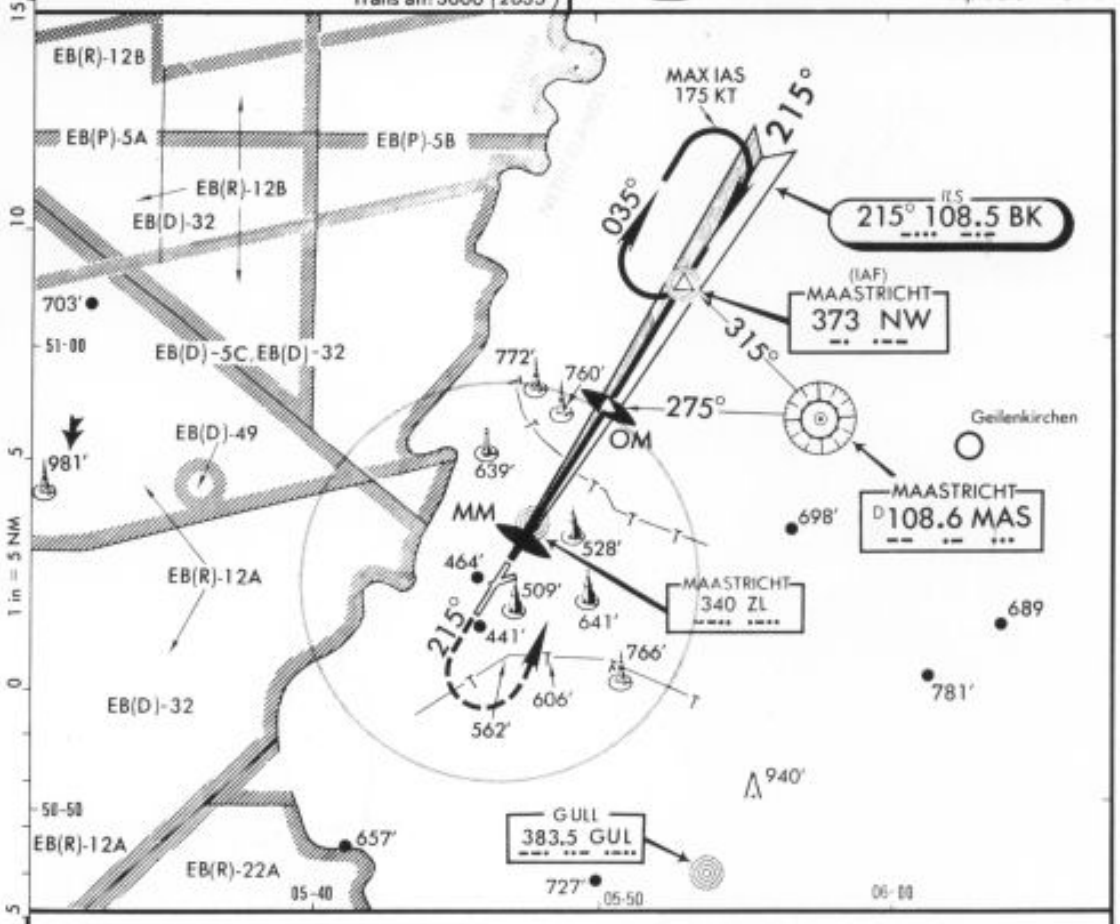
BEEK Tower 120.2 (except btn SAT 2200 - SUN 0600)

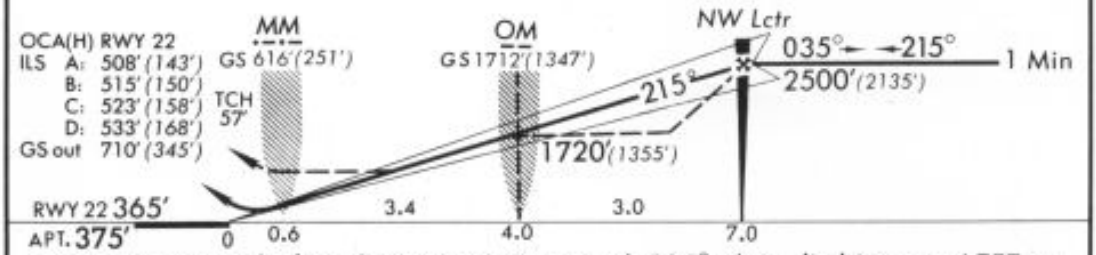
Alt Set: MB

Trans level: By ATC
Trans alt: 3000' (2635')



MSA
MAS VOR





MISSED APPROACH: Climb to 2000' (1635') on track 215°, then climbing turn LEFT to NW Lctr and hold at 2500' (2135'). Contact ATC.

STRAIGHT-IN LANDING RWY 22

	ILS			LOC (GS out)		CIRCLE-TO-LAND
	DA(H) 565' (200')		DA(H) 615' (250')	MDA(H) 710' (345')		MDA(H)
	FULL	ALS out	MM out	MM out	ALS out	
A	1200m	1200m	1200m	1200m	RVR 1500m VIS 1600m	A 940' (565') 1600m
B						B
C						C 1170' (795') 3600m
D				2000m		D 1170' (795') 4000m

Gnd speed-Kts		70	90	100	120	140	160
GS	3.00°	377	484	538	646	753	861
LOC Descent Gradient 5.2%		369	474	527	632	738	843
MAP at MM or OM to MAP 3.4		2:55	2:16	2:02	1:42	1:27	1:17

INPUT

the magazine of the
EUROCONTROL GUILD of AIR TRAFFIC SERVICES

Editor:
Patrice Béhier
98, Avenue de l'Observatoire
4000 - LIEGE (Belgium)

Advertisement Manager:
Jo Florax

Artwork:
Martin Germans

Typing:
Josette Noelmans

Lay-out:
Paul Demelinne

Staff Writer :
Norman Brown

Address:
INPUT
Postbox 47
6190 AA BEEK
The Netherlands

Bank:
AMRO BANK BEEK
Account nr.: 46.86.12.254

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Jeppesen charts the World!
by Joe Florax & Paul Hooper 2

IFATCA President visits Maastricht UAC 8

Adolphe
by Philippe Domogala 9

Delta Air Transport (DAT)
by Joe Florax 12

Ramstein Flight Operations
by Tech.Sgt. Phil Haines 17

Airbus Letter 23

From Matcab....with love
by 'Spike' 25

EGATS Technical Committe
by Henk van Hoogdalem 26

Flight Crew Interaction
by Mr. Foo Ah Chai 27

EGATS
EUROCONTROL GUILD OF AIR TRAFFIC SERVICES

by Jo Florax and Paul Hooper

In the limited period of a European summer, hot cloudless days are to be considered privileges, not rights, and are to be retained in the memory like treasured keepsakes. Despite feeling honored by the warm smiles that the gods were bestowing upon us we could quite honestly have used temperatures nearer the seasonal average for our drive to Frankfurt. Lacking maps of the city we assumed that the reputation of the Kaiserstrasse would make itself readily apparent to us. That assumption, the Jeppesen offices by lunchtime. The Kaiserstrasse is a hive of activity, with a galaxy of fine shops, airline offices, restaurants, and various other industries which our chaste minds had difficulty in comprehending. Number 77 was at the wrong end of the street!

We were welcomed by Mr. Eberhard Deparade, Marketing Services Manager, whose hospitality during our visit left us feeling distinctly humble, to say the least. In a comprehensive tour of the premises Mr. Deparade explained every detail of the processes involved in the production of Jeppesen wares. So much information passed through our brains that afternoon that we concluded our tour staring blankly at each other mumbling "how the hell are we going to make an article out of all this"? We therefore have to admit that there is no way we can fully do credit to all the effort that Mr. Deparade put into our visit that day, and that if our end product appears vague and incomplete you will accept our apologies but be tempted to go along to Kaiserstrasse 77 yourself to gain first hand experience of the very involved process.

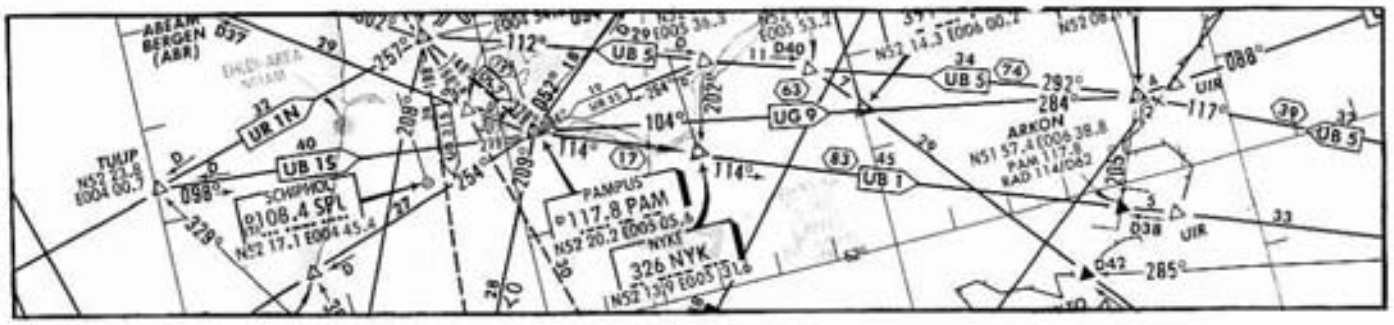
Elrey (Jepp) Jeppesen was just eighteen when he joined the famous flying circus, selling tickets, swinging props, and later progressing the wing walking. In 1926, at age 19, he learned to fly and shortly afterwards purchased his first airplane with $ 500 he had saved. The son of a Danish cabinet maker, Jeppesen went on to form his own flying circus operating in Oregon and Washington states. In 1930 he joined the Boeing Air Transport Company, forerunner of United Air Lines, flying mail between points in the north-west of the United States. Conditions were arduous and often hazardous; during his first year with the company Jeppesen lost a number of colleagues in flying accidents. The lack of navigation aids added to the already numerous dangers encountered by pilots of that era. Jepp was convinced he could do something toward alleviating some of the navigational problems and, with the aid of a ten cent notebook, began recording information relevant to the safe conduct of his flights: airport layouts, dimensions, obstacles, terrain relief, and even telephone numbers of farmers who could provide weather reports. On his days off he could be found climbing hills or other obstacles with an altimeter in hand in order to ascertain precise elevations, which were then entered into his notebook. Word of Jeppesen's safety

record and of his "little black book" soon got around and Jepp found himself being approached for copies of his compilation. Although originally intended purely for his own use he was inundated with requests for which he began to charge $ 10 per copy. Demand soon outgrew supply to the extent that Jeppesen was pressured into forming his own publishing company. To accomplish this he borrowed $ 400 and set up business in the basement of the house in which he was renting a room in Cheyenne, Wyoming. In 1934 he published the first Airway Manual. The operation soon became too much for one man to handle and Jeppesen offered the business to his employers, by then, United Air Lines, for $ 5000. The airline

refused. Subsequently transferred to Salt Lake City, Utah, Jepp was able to employ a small full time staff, and so the company began a long process of expansion. In 1954 Elrey Jeppesen took early retirement from United in order to devote his attention full time to the publishing company, which, by the end of the fifties, employed over 200 people in a facility at Denver's Stapleton Airport. Today, staffed by more than 400 people, the company's headquarters is still located in Denver but in the south-east quarter of the city, at the Inverness Business Park. 1957 saw the opening of a branch office in Frankfurt, West Germany, whose responsibility would be to serve the European, Middle East, African and Asian markets.

Jeppesen sold his company to the Los Angeles based Times Mirror publishing conglomerate in 1961, remaining as president for the next five years prior to becoming chairman. In 1970 Times Mirror merged Jeppesen with another of its acquisitions, Sanderson Films, to form th present day Jeppesen Sanderson, Inc.

I think we were both surprised on arrival at Kaiserstrasse 77 to find that the Jeppesen premises were not contained within a characterless corporate block of gold tinted glass. Instead, we took a step or two back in time as we climbed the stairs to the company's reception office. During our visit we remained encapsulated within this time warp; air conditioning consisted of opening windows, thereby conceding admittance to the noisy hustle and bustle of downtown Frankfurt on a warm June day. Nobody seemed unduly perturbed by this. It was indeed a joy to see that a large part of the Jeppesen production process was still



I C B

INFORMATION CONTROL BULLETIN No. 117-86

117-86

24 JUN 1986

117-86/1 ZARAGOZA, SP. From 23 JUN until 21 JUL 86 ILS GS RWY 31R and HIALS RWY 31R u/s. (CL I A 1534/86, & 1535/86, 115).

117-86/2 CARDIFF, U.K. Eff 31 JUL 86 IAP NDB RWY 30 estbld, evaluate (CL II A 348/86, 134).

117-86/3 CARDIFF, U.K. Disregard ICB 112-86/45 chg of mag Var of apt, Lctr "CDF" and "GG" and RWY bearing, present RWY brg 124°/304° remains unchgd. (CL II A 348/86 and II A 309/86 and AIS decision 24.6.86, RV).

117-86/8 UNITED KINGDOM. Eff 31 JUL 86 new Danger Area EG(D)-210 estbld: circle radius 0.5NM centered on N5244.16 W00255.01, GND-1000' ALT, activity by NOTAM. (CL II A 353/86, 134). Terminal: Shawbury (AB) affected also.

117-86/9 AVORD, FR ... RWY 24--51'. (COM 2-13, 10 APR 86, 35).

117-86/10 BASIIA ... N423303 E0092910, loc unchgd. (AGA 2-

117-86/22 MAL...

117-86/23 G... E...

117-86/24 ...ld

117-86/25 ... -- ...note:

117-... ...of DARDS

117... ...-2, JUN

117-86/48 BRAZIL. EFF 3 JUL ... 25/86, 24 JUN 86).

117-86/49 COCOS I. AIS Rte B340, CRP ENKIK minor coords chg to ... ...n SP(H/L)-9 rcvd with DEN 025/86, 24 JUN 86).

117-86/50 DUNSFOLD, U.K. EFF 31 JUL 86, LARS avbl within aprx 25NM radius of 5107N 0032W on freq 122.55 and 277.6MHz, W of line 512006N 0003527W - 511125N 0003008W - 5101N 0002520W - 504955N 0001732W. ENROUTE E-35 affected. (CL II A 347/86, 134).

conducted manually. This is not to say that the place was totally devoid of word processors and conversations via computer terminals. They were certainly present, with important roles to play, but so also were the draftsmen and cartographers, applying pen to paper or transparent overlay, and the young girl under training pressing Letraset style symbols onto an original approach plate with already impressive precision. As Mr. Deparade explained, electronic drafting will be employed with a few years but for the time being its symbolization just does not offer the required degree of clarity. Whichever system is ultimately selected, both the Frankfurt and Denver offices must of course produce the same result.

Jeppesen charts and Airway Manuals are the product of the dissemination of extensive information received from aeronautical authorities worldwide. The personnel of the AIS Department review, analyze and evaluate the incoming data as speedily and as accurately as possible; immediate correspondence being entered into by the AIS research editor to verify missing or incomplete information. In addition to the daily analysis of more than 500 Class One NOTAMS, up to 100 Class Two NOTAMS and the usual influx of AIP amendments from over 120 countries, a significant number of enquiries are undertaken. A simple one line NOTAM can involve hours of time on the computer doing calculations and resulting in queries being directed to any number of neighbouring aeronautical authorities. During the course of a day this analysis and clarification process will have generated an average of 50-70 changes to the Airway Manual. Each change is allocated a number and appended to a list compiled on a daily basis ; the Information Control Bulletin (ICB). The ICB is distributed among the various sections of the Charting Department for further actioning. Area and en-route charts are updated by reference to the ICB. The update process is a manual one using transparent overlays precisely aligned on a light table of four square meters. Compilers and draftsmen constantly work under pressure of time constraints. Nevertheless, the process of removing and replacing photographically reproduced type, lines and symbols is an exacting and time-consuming one.

While the area/en-route department has around 1800 original charts subject

to update, the neighboring Terminal Procedures department can boast a total of 4700. This number can be further boosted by certain airlines' requirement for "tailored charts", the basic original with additional info or text suited to individual airline needs. The procedure in this department is similar to the previous one with the ICB used as the basis for modifications. Our comprehensive tour of the Jeppesen premises continued through the Text and Photo Departments; already our minds overloading with the wealth of information being delivered to them.

As the name suggests the Text Department is responsible for producing the "text" sections of the Airway manual plus the provision of special services, such as the production of technical manuals in various languages. For the first time

JEPPESEN
COMPUTERIZED NAVDATA SERVICE

Official Government Agencies
Dissemination of Navigational Data and Procedures

JEPPESEN
Airway Manual Service
(Present Chart Service)

JEPPESEN
Flight Information
Recording & Processing of Worldwide Navigational Data and Procedures

Computer Graphics

JEPPESEN NavData
Worldwide Computerized Navigation Data Base
Formatted in accordance with ARINC Specifications 424

CONTENT

AIRPORTS	AIRWAYS	HOLDINGS	NAVAIDS	TERMINAL PROCEDURES	WAYPOINTS
Runways ILS	High Altitude Low Altitude	Enroute	NDBs VORs DMEs VOR/DMEs TACANs VORTACs	SIDs STARs Approaches	Enroute Terminal Off-route

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on a recurring 28-Day Cycle

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- Commercial Computer Flight Plan Producer
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In-Flight

Flight Management Computer System [redacted]
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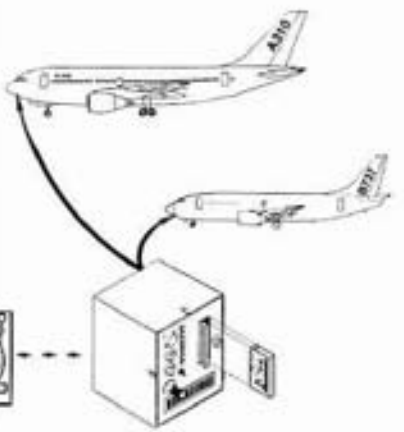
Hardcopy Printout of NavData

Production Magnetic Tape CARTRIDGES

CUSTOMER

Avionic Industries

Processed JEPPESEN NavData adapted to be compatible with the specific operational software of each manufacturer's Airborne Computer Navigation Systems.

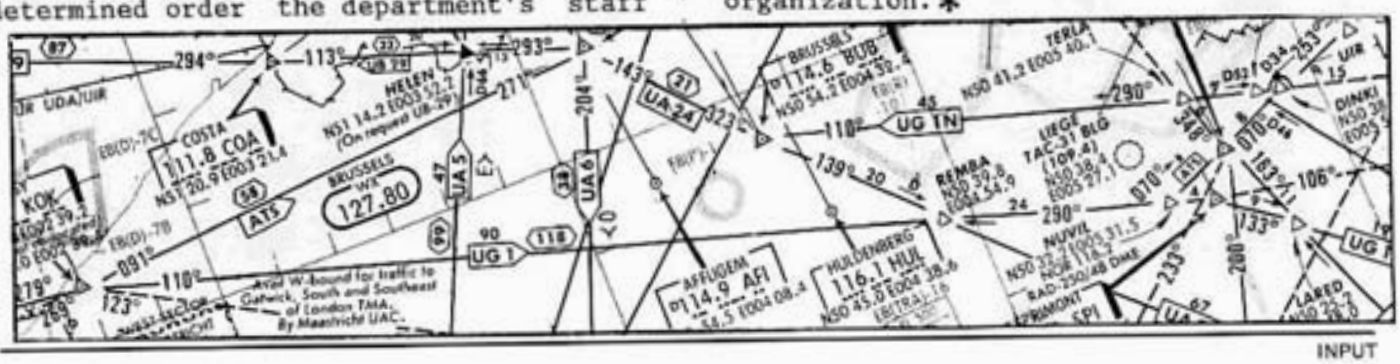


during our visit automation was very much in evidence; the department's ladies accessing the Honeywell Bull HP3000 via the all too familiar keyboards and VDTs. This data processing system is also utilized by other departments and is charged with, among other things, production of address labels for the weekly distribution process. Stored data ranges from postage details to statistics to bookkeeping. The Text Department has access to all the navigational data on file and makes updates by reference to the ICB.

Having received the attention of compilers, cartographers, draftsmen and the scrutinies of Quality Control the completed chart is ready for delivery to the Photo Department. Under the time constraints dictated by printing deadlines the new or revised chart is converted to film, complete with reference marks to facilitate any necessary cutting or folding required at the printing plant. The penultimate product, in either positive or negative form, must be in the printer's charge by noon on wednesday of each week to enable distribution to be effected on Friday. The printing and distribution of weekly up-dates is effected by the Erasmusdruck company in Mainz which has held the contract since 1957. The enormity of that company's responsibility was made abundantly apparent on the day of our visit to Frankfurt when Mainz was preparing to distribute a total of more than 1,6 million amendments to approximately 170,000 individual subscribers and 260 airlines!

As a new subscriber to Jeppesen's Airway Manual you would, I'm sure, be truly amazed at just how your Manual is collated. The dispatch office of the Customers Services Department is dominated by rows of two meter high compartmented shelves, each compartment stacked with a page of the Manual. Although unable to actually witness the process in motion we were assured that by snatching pages from the compartments in a predetermined order the department's staff was able to put together a complete Manual within a very short space of time. Such hasty action invariably leads to a number of pages finding their way to the floor; indeed the floor had acquired a liberal coating of paper at the time of our visit. This is discarded at the end of the day rather than consuming valuable time returning each sheet to its appropriate compartment. The collated Manual is carefully checked for content and order prior to shipment to the customer. Jeppesen's many other products are also dispatched from this office.

Unfortunately our limited time in Frankfurt precluded our looking into the Jeppesen Computerized NavData Service. Simply, NavData is an electronic version of the Airway Manual, all the usual Manual data being contained within a magnetic tape cartridge for introduction to an on board Flight Management Computer System via a data base loader. The first commercial flight using NavData was flown in July of 1973 and the system has subsequently been developed to serve not only airborne navigation purposes but also computerized flight planning and flight simulation. As with the Airway Manual NavData can be delivered either with standard information or tailored to suit the requirements of individual operators. The data base is continuously updated and new tapes are dispatched to subscribers every twenty eight days. Jeppesen is in the very enviable position of dominating the aviation world's production of aeronautical charts; only the British Airways Aerad system and national AIPs provide the company with any form of competition. Indeed, Jeppesen actually has contracts to produce some country's AIPs. The lack of competition does nothing to prevent the end product being of the ultimate quality and every measure is taken to ensure that the company's prime aim, aviation safety, is in no way compromised. Jeppesen, with its weekly amendment service, can quite rightly claim to provide a faster, more complete service than any equivalent organization.*



IFATCA PRESIDENT VISITS MAASTRICHT U.A.C.

Photography by
Mr. Walter Endlich

On 24th February, 1987, on invitation of EGATS, the President of IFATCA, Mr. Erik Sermijn, visited the Maastricht UAC. He was met on arrival by EGATS President, Jan GORDTS, and after a visit to the operations room, he was introduced to Mr. Walter ENDLICH, Deputy Head of Operations and to Dr. H. von Villiez, Director of the Centre, who confirmed the support the Agency was giving to IFATCA affairs.

After a lunch with Members of the Executive Board of EGATS, a discussion took place on various items of interest to both associations.

Erik SERMIJN was elected President of IFATCA in 1986 in SAN JOSE. He was previously Vice-President, Professional (1982-1986) and prior 1982 he was President of the Belgian Guild. Erik is still working as a Radar Controller in the Brussels ACC.*

ADOLPHE

by Philippe Domagala

It all began in 1960, in the then French West Africa, in a place called PORT-ETIENNE, now NOUADHIBOU, Mauritania. We were there, my mother and I waiting for a French Air Force DC3 which was supposed to take us to GAO, 2000 Km further across the Sahara, where we lived at the time.

Port-Etienne was then a French Navy Base where the European people lived in white concrete igloos placed directly on the sand, and affectionately called "nichons" ("boobs" in English). Behind the boob that was used as an eating place, a few pigs were raised on the left overs of the garnison. The owner of the pigs was a friend of the manager of one of the only two restaurants GAO possessed, and he had decided to offer one of his animals to his friend. The Captain of the DC3 being good-natured, it was then decided that the pig, nicknamed "Adolphe" because of its friendlyness, would be placed in a wooden cage, in the cargo part of the aircraft which was, in a DC3, situated between the passengers. The passengers were sitting with their backs towards the windows and thus facing each other in those days, the space between them filled with cargo.

Adolphe's cage was fixed in the aft part of the aircraft. The DC3, being a tail-wheel aircraft, standing tail-down on the tarmac. The Mauritanian helpers, believing they were doing their best for the pig, with the help of other pieces of cargo, fixed the cage in a position as horizontal as possible to the ground. Adolphe seemed very pleased with the arrangement. But soon after take off, the 250 pound animal found itself in an awkward position, the aircraft being level, but the cage leaning steeply forward. This fact, probably combined with the noise of the engines and some turbulence, annoyed our pig which began to grunt and tried to break the cage, much to the amazement of the 15 passengers on board. Their amazement ceased,

however, when Adolfhe finally managed to break open a gap in the cage and began punching its nose against everything that came in its way, and all smiles faded completely when Adolphe attempted to dig a hole into the aircraft floor, having already found its way through an inspection door.

It soon became obvious that Adolphe had to be stopped in a more permanent way as the bumps it was receiving on the head seemed to excite it further instead of slowing it down. Unfortunately the only weapon on board was a small fire axe, so you can imagine that it took some time for Adolphe to surrender. Of course the battle-field was quite impressive, with pieces of wood, aluminium and blood all over the place, at 10.000 feet altitude and with a temperature of 30 degrees C in the cabin.

We then landed at AIOUN-EL-ATROUSS to refuel. Aïoun was a strip in the desert with a few thousand 200 litre-AVGAS-barrels, a hand operated pump, a Touareg with his 12 wives and 40 children keeping the barrels and a couple of legionnaires keeping the Touareg. Adolphe remains caused a sensation there, but with the ambiant heat (47 degrees C on the tarmac) and a lot more flying hours to go, it was decided to leave most of Adolphe to the legionnaires for immediate consumption. The Touareg being a Muslim would not touch it. But the 4 legs were re-loaded on the DC 3, wrapped in an army tent cloth and sprinkled with all the salt available in Aïoun. This wonderful idea came from a passenger whose mother apparently knew how to make ham.

We then flew a few more hours in an aircraft stinking of blood and Avgas, the Captain having tried to clean some of the blood stains with Gasoline. After another technical stop in BAMAKO, we finally arrived in GAO.

The restaurant owner was waiting for us on the tarmac. She was a charming old Vietnamese lady who was a former brothel owner in SAIGON during the Indochina war and who dedicated her life to following French troops whenever they went, including remote places.

Anyway we gave her the strory and the 4 hams and went to bed. But the restau-

rant cook did not like, or more likely did not trust our preparation, and decided to chop everything and turned the 4 hams into "Imperial Patés" (or "Nems" in vietnamese, for the initiates). Of course all passengers and crew were invited the next day to taste "Adolphe's nems", a new Franco-Malian-Mauritanian--Vietnamese speciality, (a bit too salty, but very nice).

The DC 3 went into repair but some of the blood spilled around was still visible years later. Most of the passengers of that flight kept in touch with one another for a very long time, remembering, while having a drink during the late African evenings, the Adolphe saga. Adolphe's nems remained on the menu for the "Transaharien" restaurant in Gao until it closed down a few years later.*

don't forget
(WRITE IT DOWN)

NEXT COPY DEADLINE:

30TH MAY '87

DELTA AIR TRANSPORT

— by Jo Florax—

THE SKY IS THE LIMIT .....

They pretend to be "the only Flemish airline" with their Leitmotiv "The sky is the limit" in flying to new horizons: Delta Air Transport (DAT). Started as a modest taxi-company in 1966 with beechcraft, late DC3, a Convair, a DC6 and DC8, towards 1977 DAT operates turboprop Fokkers, more than in the past the guarantee for an optimal and various service. Antwerp is the homebase of DAT (75 employees) which operates scheduled services for Sabena (50% ownership) and KLM (33 %) by 5 Fairchild FH-227s (OODTA till OODTE). 17% are in the hands of Belgian investors. Every day DAT does the route Antwerp-Amsterdam on behalf of KLM and Brussels-Amsterdam for Sabena. The FH-227s, giving capacity for 48-52 persons, are considered to be the best equipped for continental flights in distances between 8,00-1,200 kilometres. DAT-aircraft are also hired by Crossair (daily Basel to Munich, Paris, Frankfurt and Geneva) on the basis of wet lease, by Air Lesotho to cover the regional routes in southern Africa out of Moseru. DAT always holds some aircraft at the disposal for charter flights and for ambulance flights in holiday periods. For this purpose the Fokkers are then equipped with 8 brancards and at the same time they can transport 28 passengers, including a medical team.

Another aspect is the transport of freight for KLM-cargo from Antwerp.

For information about present- and future developments, we should make acquaintance of Mr. DAT, the main behind the number one of the Flemish aviation, General Director Tony van Grieken, who here reveals his philosophy behind the success and continuation of his airline. Anywho has grown with DAT grown with Delta Air Transport. A manager who knows

better than anyone that the profit of an airline is poor in relation to big investments in aircraft as well as in highly qualified staff. An aviation adept too, operating carefully and only giving the green light after a thorough study of the market. This market changed a little

to the benefit of regional transport since Sabena took part in the company and that resulted in more scheduled flights than charters, no general aviation or taxi work anymore. Tony van Grieken: "In the morning we operate to London and back and we repeat that in the evening. In between we do Antwerp-Brussels-Munich, and that is our operating day. On Saturdays we will fly to Copenhagen and on Sundays Dublin and ZÜrich and just a year ago we connected Frankfurt with Antwerp. In the past we also had a connection to Paris, but we were not allowed to do this on the basis of a one-day-return trip. To London Heathrow we will take over the 737 operation from Sabena with our new F28 which we have just purchased, as the 737 will be charged with more suitable routes within Sabena". The mentioned F28 is the F28-300, sold to Delta Air Transport by Pilgrim Airlines via US-Air and registered as OODJA, ready for service as of April next. At the time when a flight simulator will be installed at the Schreiner location in Beek, DAT will certainly make full use of this if possible.

Picking up London from the regional network, it is renarkable that there is a careful approach with respect to the London Stolport. Tony van Grieken: "Yes, the Stolport, that is a project we have under study and which one can approach from two sides. This is the real commuter-work without any feeder aspect. For these passengers, that must remain in London we have to be in the city, the operation then is restricted to the Dash-7 for the time being. A passenger from Stuttgart for instance on his way to London would do better to fly to Heathrow and pick up the train or subway to the city (he will lose less time this way than by using a slower aircraft flying the same distance. So, that will only interest people at a distance of one hour flying from the Stolport". There seems to be a minor enthusiasm about the Stolport and many regional companies doubt the value of the London Stolport. It also seems that those regional airlines under the umbrella of big brother, have a more solid existence than others, taking into account the famous liberalization of the market: "This is an evolution all over the world", he adds and "in the past you always had connections to major cities, that has changed and we now go to the third echelon, the creation of the commutor, the real third level that makes it possible to fly from the one regional airport to another. So, as a regional airline we have two missions, the regional aspect and the feeder function to major cities".

The Director General now looks into the future for a new evolution (no revolution): "If then you can operate twin-engined flights accross the Atlantic, more and more from smaller airports, the feeder aspect will no longer be required, and nor the commuter aspect. As a small company one must possess the flexibility to adapt yourself to that evolution. That is why it is so difficult to make a five-year plan because you don't know where this evolution will go to". What about the rise of so many regional airlines at the moment? "Overcapacity", according to Tony van Grieken, "especially if you survey the average number of passengers on board". He illustrates a situation which is common at many regional airports: "Just go to the A6 (term for departures), count the passengers and you will come to 6 or 7

people, except for some destinations to England like Norwich". A possible solution of our regional expert: "Whether the fares have to be reduced giving us more passengers, or the frequency of flights or consider different scheduling, I think the offer is running faster than the question, especially in the Netherlands".

Delta Air Transport, however, has been able to mark their field of operations together with Sabena. All operations below the 100-seat capacity belongs to DAT, from the very small ones, the 15-seaters till the F28, the eighty seater. So, where Delta Air Transport stands for will be a fleet composition of 30-seaters for the smaller airfields, keeping some of their Fairchilds (for certain destinations the FH27s are too big) for the middle range, added with their F28. Subcontractors will be charged with operations below the 20-seater capacity. Within this framework several types of aircraft will be considered for purchase, like the Dash-7 (only for stoll capacities), F100 (the F50 would not fit in the 30-seater class), SF34 and E121. Because of the partial Sabena ownership, the latter does studies for DAT concerning the future regional network operation with the new 30-seaters. And those aircraft will be bought, lease-purchase will not be considered. Flying with DAT means you will have to look in the Sabena or KLM timetable under SN or KL tripnumber as Sabena holds a monopoly position.

Delta Air Transport does not opt for air-freight, they have been going into this, also for the purchase of new aircraft, but Tony van Grieken carries on "there are two sorts of airfreight, the old-fashioned transport of goods from Airport-to-Airport and the courier service from door-to-door and in this business there is a change going on by the introduction of the telefax, doing the transport of documents faster and that was the easy work for our aircraft because you don't have to reconfigure them".

DAT is proud of their ability to perform the maintenance and repair work

in their own workshops at Deurne and all that is computerized except for the components. Official recognition by the Belgian Board of Aviation and the Federal Aviation Agency endorses this operation and they are often requested to undertake technical work or overhauls for other airlines.

Delta Air Transport goes for growth step by step meanwhile picking up new challenges. As chairman of the AIDA-group (Air Industries Deurne-Antwerp) they actively participate in the construction of the MBB (Messerschmidt-Bölhow Blohm) army helicopter and act as a deliverer of parts and as quality-controller.

And for what the future is concerned, over two years from now we will confront Tony van Grieken and ask him how his planning and vision have developed.*

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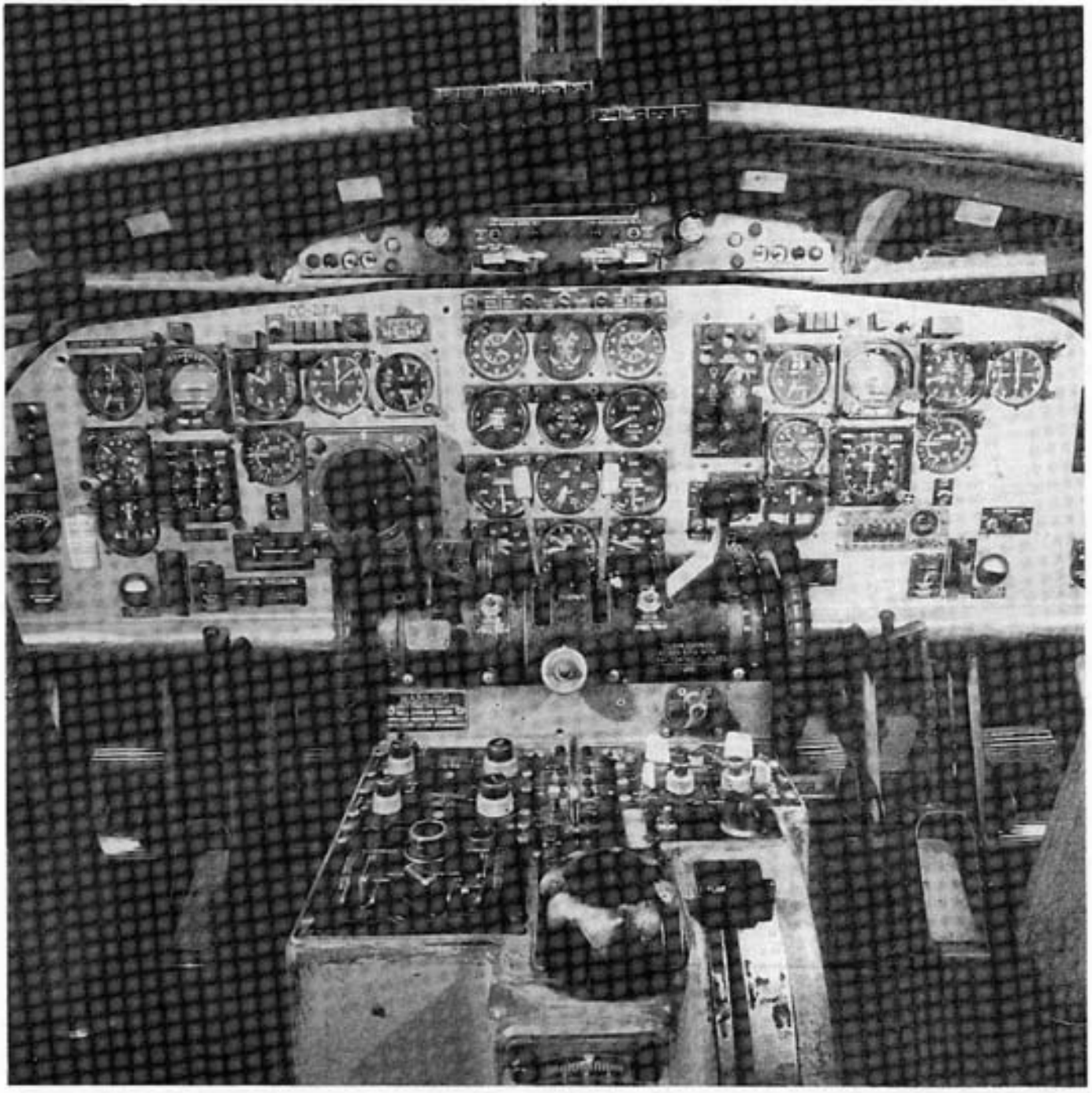


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FLIGHT CREW INTERACTION

by Mr. Foo AH Chai, flight engineer in charge
B 727 Fleet Singapore Airlines

Pilots, particularly, commanders often set the atmosphere within the flight deck. More often than not, the working environment then assumes the character of the pilot-in-command. Whilst some commanders allow for flexibility of 'decision-making' amongst the cockpit crew; some wield a very rigid 'carrot and stick' aproach. Over the years, Foo Ah Chai, has been observing how crew react in differing situations, here are his observations ...

The flight crew retrieves his new roster from the pigeon hole and studies the flight details. A satisfied grin, non-commital glance or disappointed frown reveals his enthusiasm towards the rostered duty. This unconscious gesture could be due to a number of reasons like the length or period of rostered sectors, his preference and liking for the destination stations or the seasonal climate at the destinations. However, one probable reason for the behaviour could be his anticipation of the working atmosphere in the cockpit during the flight. A long night flight spanning continents is bad enough as a mental and physical stress factor. Adding a reserved, unfriendly or even oppressive working environment for a 12 day trip half way round the world will zap the zest out of the most enthusiastic crew. A pleasant working relationship within the flight deck not only reliefs the physiological and emotional stress associated with the fast and furious changes in conditions and times from air transportation, but contributes to crew effectiveness and performance, safety as well as efficiency of resources utilisation.

Human Factors.

Every crew member knows the objectives of the team: to transport important payload, whether people or cargo to required destinations safely, effectively and economically, quite often with the same order of priority. Before the crew even embarks on the preflight planning, aircraft manufacturers, airlines and various aviation authorities have meticulously designed equipment, formulated procedures and checklists and provided training aids, literature and expertise for maximum performance and safety. Initial flight crew development begins with introduction of aviation rules, theories of flight and procedures. Armed with the required knowledge the crew undergoes disciplined training to develop skills necessary to perform the function of a pilot or flight engineer. Once deemed to have acquired the skills of a flight crew he faces the peculiar requirement of the profession in having to undergo the mandatory six monthly technical competency checks. The main reason for these regular checks is due to the nature of his profession. Although the main objective of providing safe, effective and efficient transportation is precise and clear, the en-route hazards and

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problems encountered are far from certain. An aircraft travelling in a deceptively hostile environment faces transitory problems which are both varied and unexpected. Action from the flight crew quite often have to be spontaneous and requires a certain amount of urgency. The regular technical check is necessary for reinforcing the pilot's psychomotor skills and spontaneity in reacting to critical failures and to test his knowledge of the aircraft equipment, limitations and procedures. However, the crew who thoroughly learns and operates by the rules and refers to the checklists religiously with no awareness to the human factors in transactions may be induced to perform by rote.

Among the criteria being observed by check, air-men during these six monthly proficiency endorsement flights, often through "sweaty" details in the simulator, cover crew-coordination and team work. These terms should explore beyond the laid down operational philosophies, flow patterns and communication priorities recommended in the Operations Manual. There is much interpersonal skills involved in every transaction in the flight deck. Human factors shade the degree of success in the crews handling of inflight problems. Two different sets of crew may be able to return their aircrafts with exactly the same multiple failures to the airport safely, but what happens before engines are finally shutdown are never the same. It depends on the commitment and understanding shown by the individuals acting as a team, whether they are complementing each other or getting into each other's ways. The crew must understand that although inflight duties are classified into sub-units and departmentalised into commander's, first officer's and flight engineer's actions any problem encountered should involve all 3 members to a varying extent. The pilot's and flight engineer's duties, where some see as distinct decentralisation of responsibilities should be integrated effectively. Because inflight problems are transitory in nature and there are frequent interplay between safe parameters and economic considerations or between doing the right things and doing things right it should be expected that conflicting views arise, between the crew, especially when viewed from the pilots' point of view and from the flight engineer's point of view. The outcome depends to a large extent on the human side of interaction.

Conflicting views is a necessity they are amicably resolved through understanding, tolerance, and open confrontation. They serve both as check systems and participative involvement when handled properly. Therefore comments by pilots on flight engineer's actions and vice versa must not be received defensively as encroachment into one's area of responsibility, and comments should only be voiced with constructive intent. The test comes when one's speed control, method of establishing fuel quantity with unserviceable gages, or intention to deviate from certain philosophies in times of multiple failures are questioned. The manner in which such questions are raised and their responses vary according to how well the crew work together and understand each other's points of views.

Team Result.

Where there is a genuine tolerance and patience towards feedback on debatable transient deviations from normal operations and where criticisms are intended to keep every crew member in the loop, there exists a healthy situation of open interaction and not one which is lacking in initiative and where the crew members constantly refer strictly to the book's apportionment of every action. There will be more alternatives available to solve any problem and a sense of worth and contribution towards the team effort prevails. Invariably the final solution will not only be received with involvement and ownership by all team members, but will be superior to the sum total of each individual member's lonely effort. In a team everybody can contribute directly or indirectly, whether he is a pilot or flight engineer. I heard of a flight

where the aircraft had snugly captured a perfectly stable ILS signal where the calm was broken by a worried report of wrong height indication at outer marker by the First Officer. Tension mounted as the hazy atmosphere obscured all ground reference and especially after a quick cross check between both altimeters showed the aircraft about 300 feet closer to the ground than the published outer marker height. While the pilots were trying to establish their actual position and ebating whether a go-around should be considered, the flight engineer, possibly with less things on his mind spotted that the QNH was set 10 milibars below the reported atmospheric condition. Although the mistake in setting the wrong QNH was attributed to an unusually high atmospheric pressure plus difficulty in understanding the strong foreign accent of the ATIS, the fact is that occasionally one can spot discrepancies quicker from a different perspective. There was also the case of the pilot spotting the closed bleed valve causing a failure to activate the starter with normal as well as the alternative manual start procedures even after ensuring that circuit breaker was in. Earlier a maintenance verification of an anti-icing valve operation resulted in one engine bleed valve being positioned to the closed position. The flight engineer was so sure that the bleed switches were all opened because he had completed his preflight checks before the engineering verification. These cases indicate that the team performance give better results than individual effort.

Human Resource Management.

While technology in aviation has been advancing at a neckbreaking pace where aircraft reliability and redundancy in systems are increased, the disturbing statistics of fatal accidents attributed 80 % to human error. More attention is now placed on what actually goes on behind the cockpit doors. Information from cockpit voice recorders, anonymous incident reports and other accident findings establish that the 3 crew members display all the characteristics of any large organisation; involving planning, organising, implementing feedback and controlling. The profession of flying has now begun to include the art of managing all their given resources, especially the human aspect. Various airlines have embarked on programmes like leadership training, line oriented flight training (LOFT) and human resource management where emphasis are placed on social as well as psychological behaviour of the crew. Each crew's behaviour can be explained by the complex combination of group characteristics resulting from the individual's psychological make-up, role perception, work ethic and sense of belonging. There are no lack of situations in flying for observing the variety of leadership styles, contributions to the team, emotional control and perceptions by by individual members when meeting a problem.

Many years ago I observed a classic case of mismanagement in the flight deck during a B707 simulator base check where all the 3 crew effortlessly, contributed to a disastrous outcome. The result was due to a number of reasons.

Besides the poor understanding of systems there was no coordination between the crew and total lack of emotional control. Surprisingly as I remembered, the atmosphere as a rather relaxed one.

The captain managed to control the aircraft without outboard engine unserviceable onto the glideslope. A slight crosswind did not trouble the pilot flying to any noticeable degree. Meanwhile a slow leakage has developed in the utility hydraulic system. Although the system was associated with the flaps and gears, the rate of leakage was too slow to affect their serviceability. At 1000 feet to touch-down, the usual standard call-outs were carried out with the flaps and gears already configured for landing. The somewhat unattentive flight engineer carried out a final panel scan on his station and noticed the lonely hydraulic quantity gauge (the hydraulic pump control switches are all at the first officer's station) indicating barely half a gallon of skydrol fluid remaining. It was amazing how the atmosphere in the flight deck changed when the flight engineer blurted out his discovery with a voice filled with urgency, his tone carrying a message of immediate action required. The commander was convinced of the necessity for an instinctive reaction, especially after his quick glance, guided to the tell-tale gauge by the flight engineer's index finger confirmed that his aircraft was suffering from something else besides an engine failure. Without analysing which system an almost zero reading of the hydraulic gauge would affect (a utility system leak will give an indication below the balance line figure of 3.2 gallons as is the case), the captain demanded with an authoritative voice for the first officer to switch-off the auxiliary system which controls the rudders. With unquestioning obedience the first officer killed the precious hydraulic power to the rudders and the feedback from their mistake was through the commander's legs when all the rudder input he could muster did not prevent the localiser from drifting away (minimum control speed in air with one engine inoperative plus rudder boost unserviceable is increased greatly in the B707). And to place the aircraft further out of control the commander elected to overshoot. Increased yaw developed, as go-around thrust was applied, both the flaps and gears failed to respond to first officer's control and the flight engineer watched in vain for the normal cycling sequence in the landing gear annunciator panel.

The above incident indicates to a certain extent the unquetioning compliance to requests for action as put across by Paul Tillich - "The passion for truth is silenced by answers which have the weight of undisputed authority". While results from the concerted efforts of the individual crew are mustered through proper chain of authority, there are occasions where the first officer and flight engineer have to question the validity of decisions taken by the commander. His acceptance of such confrontations and the self confidence of the first officer and flight engineer in questioning the wisdom of debatable decisions determines the success of the team's utilisation of its human resources under similar pressures.

Communication.

Transferring and reception of information is probably one of the most essential aspect of the crew's duties. The moment he reports to the dispatch section he is confronted with a barrage of data necessary for the operation of the flight. Weather information, notices on changes in airways and aerodrome facilities, and altest update on fueling instructions and aircraft status are briefed to the crew. During the countdown proper at the preflight preparation stage, firming up of the flight's plans are achieved when final figures of payload, fuel and equipment serviceability are confirmed by the crew. Such communication requirements become even more crucial once the aircraft moves on its own power because


YES, WE ARE FILING! WE WERE NOT VERY HAPPY WITH THE SEPARATION YOU PROVIDED!...

the effectivity and success of information exchange are subjected to time constraints and pressures.

Because immediacy is necessary in many inflight situations, conflicts in opinions on the urgency and necessity of call-outs often occur. Standard operating procedures and standard call-outs help tremendously to clear most of these problems but often in overlapping situations of constant alteration in parameters and actions the crew has to decide whether to communicate anticipated information to the rest. Examples are momentary wash-out of speed close to bug speeds in windshear condition, whether to continue approach beyond miss approach point with another aircraft just commencing its take-off roll and both fuel and weather conditions being marginal or whether to call-out a reverse operating light near V_1 with all other parameters normal. Under such pressures there is a great risk of miscommunication due to incompleteness of the message or failure by receiver to understand the intended message. Example was a low oil pressure call-out when the constant speed drive oil pressure light illuminated on a take-off roll. The pilot flying aborted the take-off thinking an engine oil system failure had occured.

Besides the requirement for clear, timely and correct transmission of information, especially under stressful situations for effective communication, there are other factors in flight deck communication that contributed to the interpersonal understanding. Frank expression of feelings like "I think you should lower your gear earlier" or "your fuel gauges could be overreading" must be received with openness. When meanings are not properly conveyed the receiver may perceive arrogance, dominance or even ignorance from the other party. With such negative impression of one's fellow crew member, withdrawal and resignation hamper cooperation and smooth integration of individual efforts. Besides the negative human tendencies of arrogance, ignorance and indifference, crew has to contend with difference of cultural background, age and to constant changes of partners which can contribute to misunderstanding.

Therefore tolerance and understanding in the flight deck should prevail over stubborn beliefs, attitudes and perceptions to provide the flexibility and versatility to operational transactions which automation lacks. An effective and pleasant integration among the crew can turn a 12 day trip into a satisfying mission where every member feels that he has participated and contributed to the objectives.

Perhaps a borrowed thought on self perception and willingness to understand the other colleague - "A learned man is a liability. A learning man is an asset".*

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