focus

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Front Cover: A general scene of activity at Manchester Airport

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The Ground Handling Dilemma

Uninsured losses resulting from damage caused to aircraft on the ramp amount to many millions of pounds each year.

The Joint Aviation Regulations require that operators be responsible for the safety practices of their subcontractors. This includes those contracted to provide ramp services. These contracts are in some cases still in need of improvement as many operators still have inadequate contracts with their service providers. Some of these still include opt out clauses regarding damage caused by the contractors staff.

In general operators negotiate hard with all their service providers and ramp services do not get any special attention. Often the person negotiating the contract for the operator is not the one receiving the service and therefore is not aware of the quality of the service being provided. As long as he or she gets the service at a good rate he is seen to have done a good job.

Because the ramp service contracts are not very lucrative, and because there is no need to employ trained staff with qualifications the salaries paid for the work carried out on the ramp are comparatively poor. This may result in untrained and less capable staff being employed. The staff turnover rate in this area is comparatively higher than normal. Some service providers keep staff training to a minimum in order to keep the costs down. Even more concerning is the fact that an employee that is not performing the job well may resign or be dismissed from one organisation only to find employment with the competitor. In this way the same poor performers may continue to find work in the industry and the risk of damage is perpetuated.

Some ramp service providers are in the process of introducing logs books to record the training and licensing of their ground handling personnel. This would enable any prospective employers to see who the previous employer was and what training the job applicant had done. Hopefully this will eventually limit the employment of those ramp service personnel with a poor performance record.

In the event that an operator is not happy with the quality of service being provided he has the right to cancel the contract and engage another service provider. The difficulty is that on some airfields there may be only a few companies providing these services so there may be little or no choice.

The airport operator sanctions what organisations provide ramp services on their airport and the airlines using the airport have no say in the matter. Should the onus of auditing the service providers to ensure that they are of a sufficiently high standard then not fall to the airport operator?

Aircrew, air traffic controllers and aircraft engineers all require proper training and licensing in order to do their respective jobs. Is it not time for ramp service personnel to be brought into line? This would ensure proper training, commitment to the job and improved management, which would contribute in the long run to the reduction of the amount of damage being done on the ramp. A redistribution of the money currently lost through ramp damage could then be used to pay a better rate for the services being provided which in turn would cover the cost of proper training and certification of ground service personnel.

We all dislike additional regulation but there are times when it becomes necessary. Some European authorities are already considering the introduction of legislation to remedy this matter.

At the end of the day you only get the quality of service that you pay for.

Assessing the Risks

by Capt. Tom Croke

Anyone currently flying as a Captain in commercial aviation will have many memories of their time as a Second Officer and First Officer. From exceedingly inexperienced levels everyone gradually builds their competence and confidence as they accumulate flying hours. Much of what is assimilated in this period is done by observation and emulation of the Captains and other crewmembers with whom we have operated. With enhanced experience pilots feel confident undertaking more and more complex manoeuvres. The successful outcome of such undertakings leads to enhanced personal and professional satisfaction. However there is a balance that must be struck. While co-pilots build their experience, their capacity to successfully complete the more challenging conditions or manoeuvres needs to be carefully considered. The right decision leads to a more rounded and confident pilot, while a wrong decision, leading to a Captain having to take control from the co-pilot, may set the young co-pilots development back many steps.

A recent accident involved substantial damage to a public transport aircraft. The aircraft was flown by a moderately experienced co-pilot. The weather conditions indicated a crosswind close to limits and gusting significantly. The aircraft landed heavily and was very substantially damaged. The decision of a Captain to offer or allow someone who is moderately experienced to fly in such conditions is a question very many of us face regularly. No doubt, there is a pressure to "share" the flying, almost without regard to the prevailing weather conditions. Sometimes a decision to share is taken at the start of rotation, and subsequently needs to be reassessed due to deterioration in the conditions, later than anticipated clearance in the weather or a runway change to a more challenging runway. All of these situations, and more, require a fresh decision to be made on the advisability of allowing the co-pilot to continue flying. Because such a decision may not be popular they can often be more difficult to make, but the consequences of not making the correct decision may have "career altering" consequences.

Many companies offer guidance to pilots on when and in what conditions Captains may allow co-pilots to fly the aircraft. Some companies do not. It is incumbent on all Captains to have a clear understanding in their own minds as to when it may be inappropriate for them to offer, or allow, the choice of flying sectors to be left to the co-pilot. Each Captain must have his own criteria in his own mind, as they will be different to those of his colleagues.

Seminar 2001 - Gearing up for Safe Growth

When we decided on the topic for the Seminar we felt that this was a pressing issue that needed airing. Now with the apparent downturn in passenger numbers and air operators considering a reduction in their services, the topic may seem less relevant. I do not believe this to be the case. History has shown that lulls in business are invariable followed by an upturn and for this reason it is still as important as ever to explore the availability of trained personnel and future demand.

In fact it may be more important now than ever, as some operators may be considering making personnel redundant. These unfortunate folk could well be lost to aviation forever as they find themselves jobs in other industries. We should not expect highly trained personnel to remain loyal to the industry when they are made redundant in an effort to reduce costs. For this reason we need a plan to ensure that we can take advantage when the economy improves. Your attendance at the Seminar is vital in order that we all understand the problem and work towards a satisfactory solution.

UKFSC Legal Adviser's Column

by Peter Martin

The early days of UKFSC - Some recollections

Paragraph 78 of the 1961 report of the Cairns Committee, which gave rise to the "modern" system of civil aviation accident investigation, pointed out in paragraph 78 that there were then a number of, apparently overlapping, committees concerned with air safety. Two of these were, firstly, the " Transport Flight Safety Committee" concerned with flight safety organisation, whose members were operators and others concerned with air transport and which advised on flight safety publicity in the industry and, secondly, the "Flight Safety Discussion Group" which had a membership similar to that of theTFSC and whose members met to discuss recent occurrences and exchange ideas and lessons to be learned from them.

Cairns recommended a review to avoid overlapping and it must be the case that UKFSC results from amalgamating TFSC and FSDC; this probably took place in 1961 or 1962 rather than, as some think, in 1959 – and for other reasons which I will describe below.

1960 was a critical year, in legislative terms, for UK civil aviation. The Civil Aviation (Licensing) Act 1960 liberalised, in a small way, competition with BOAC, BEA and BSAA which had a wartime and post war monopoly save for a few non-competing charter services permitted by the Civil Aviation Act 1949. The 1960 Act, which permitted competition with the state corporations only if the competition did not materially divert passengers or wastefully duplicate services, required prospective operators to have not only an air service licence, an economic licence, but also an Air Operators Certificate (AOC) granted under the Air Navigation Order 1960 confirming the regulator's view that the operator was a fit and proper person who could operate safely. The then responsible official at the Ministry of Aviation was the newly-designated " Director of Aviation Safety", in those early days a Mr Ted Griffiths known to all of us as " The Said Ted" whose word was law in the matter of the grant, refusal and suspension of AOCs!

One of the principal reasons for the Cairns Committee, and all the subsequent legislation, was that there had been a series of cargo charter accidents and incidents in the late 1950s which had given rise to concern not only about their safety but also the way the accidents and incidents were investigated – the allegation being that they were investigated in a very punitive way by ex-RAF officers who had neither time for nor patience with human frailty! Another concern was the whole issue of what later became known as flight time limitations but was then anxiety, in a very uninformed and unscientific way, about pilot fatigue. It has to be borne in mind that, at that time, most aircraft commanders were ex-service pilots and the equipment mostly ex-WW2 surplus. The story was that an RAF officer would invest his gratuity in a C47/DC4/DC6 and start an operation – this was really the aftermath of the 1948 Berlin Airlift and the start of legends such as Freddie Laker, Harold Bamberg and others.

One of these ex-WW2 pilots was Marian Kozubski, a Polish Air Force Liberator Commander, who started Falcon Airways with a couple of Lockheed Constellation 1049s – to me the most beautiful aircraft ever to fly, equipped with (if I recall) compound Wright Cyclone engines extremely difficult to maintain. Unsurprisingly, Marian, now sadly dead, had not much regard for regulation and legislation which he thought, in his rather piratical way, a tiresome clog on the wheel of aviation progress. Time and time again, in the early 60s he would telephone me (a young solicitor admitted in 1959) early or late to complain, from Gatwick, or Lagos, or Kano or somewhere else exotic and hot, that The Said Ted had lifted his AOC and what was I going then and there to do about it?

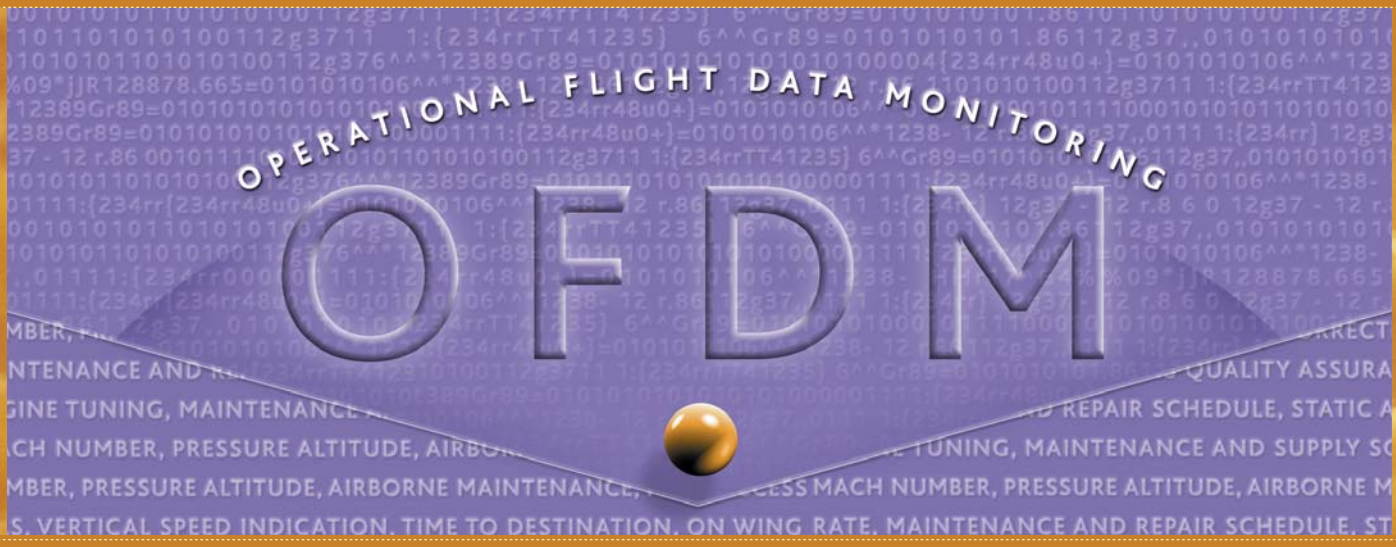
On one such occasion, at about 3am, he rang, bright and cheerful as ever and asked what I was doing; thinking at last to defeat this attractive but difficult client by a well-placed put-down, I said that I was making love to my wife in the hope he would leave me in peace. Not a bit of it. He asked at once whether he could ring again in 5 minutes!

Such people, and there were lots of them like Desmond Kayton of Trans European (2 old Rapides), were irresistible.

Remember, these were the days before MOR, before CHIRP, before the sophisticated systems of safety management we have now. No wonder UKFSC was needed as, without it, information and lessons would never have been exchanged – particularly in what became a very competitive environment.

How things have changed in these 40 years!

YOUR AIRCRAFT IS TALKING TO YOU IT'S TIME TO LISTEN



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SPIRENT Systems

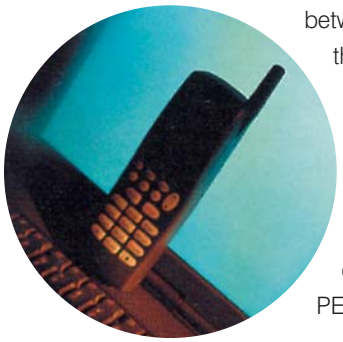
FOCUSED ON THE BUSINESS OF FLIGHT

Electromagnetic interference from passenger-carried portable electronic devices

Operators of commercial airplanes have reported numerous cases of portable electronic devices affecting airplane systems during flight. These devices, including laptop and palmtop computers, audio players/recorders, electronic games, cell phones, compact-disc players, electronic toys, and laser pointers, have been suspected of causing such anomalous events as autopilot disconnects, erratic flight deck indications, airplanes turning off course, and uncommanded turns. Boeing has recommended that devices suspected of causing these anomalies be turned off during critical stages of flight (takeoff landing). The company also recommends prohibiting the use of devices that intentionally transmit electromagnetic signals, such as cell phones, during all phases of flight. The U.S. Federal Communications Commission already prohibits the use of cell phones during flight. In addition, the U.S. Federal Administration issued Federal Aviation Regulation 91.21 to operators responsible for governing the use of portable electronic devices on their airplanes.

Electromagnetic interference (EMI) from passenger-carried portable electronic devices (PED) on commercial airplanes has been reported as being responsible for anomalous events during flight.

The operation of PEDs produces uncontrolled electromagnetic emissions that could interfere with airplane systems. Airplane systems are tested to rigorous electromagnetic standards to establish and provide control of the electromagnetic characteristics and compatibility of these systems. However, PEDs are not subject to these same equipment qualification and certification processes. Though many cases of EMI have been reported over the years, with PEDs suspected as the cause, it has proven almost impossible to duplicate these events. Boeing has participated in several related activities, and has revised its all-model service letter for concurrence with the U.S. Federal Aviation Administration (FAA) advisory circular (AC) on the use of cell phones while airplanes are on the ground. However, operators and their flight crews are ultimately responsible for deciding whether to allow the use of PEDs.



Operators can increase their ability to make proper decisions regarding the use of PEDs by becoming aware of the most current information in the following areas:

1. Testing and analysis of PEDs and airplane systems.

2. Resulting regulations and recommendations.

3. Operator actions for investigating and preventing PED events.

1. TESTING AND ANALYSIS OF PEDS AND AIRPLANE SYSTEMS

Boeing has conducted several tests and investigations to better understand the effects of PED use on airplane systems. These include analysis of operator reports, investigation of specific instances of suspected PED interference, ground and airplane tests of in-seat power, and cell phone tests and analysis.

Analysis of operator reports. Boeing has received many reports related to PEDs from operators. The majority of these reports were inquiries about PEDs in general. The remaining reports involved airplane anomalies and can be grouped into one of three categories of PED events: (1) events where PED interference was suspected (an airplane anomaly occurred when a PED was being operated), (2) events with an apparent correlation between PED operation and the airplane anomaly (the problem disappeared when the PED was turned off, either immediately or shortly thereafter), and (3) events showing a strong correlation between PED operation and the airplane anomaly (the problem disappeared when the PED was turned off, returned when PED use resumed, and disappeared when the PED was turned off again).

Of the reports involving airplane anomalies, only a few showed a strong correlation between the airplane reaction and the suspected PED.

Investigation of specific instances of suspected PED interference.
Some sample cases are included here to illustrate the variety of potential PED events.

1995, 737 airplane.

A passenger laptop computer was

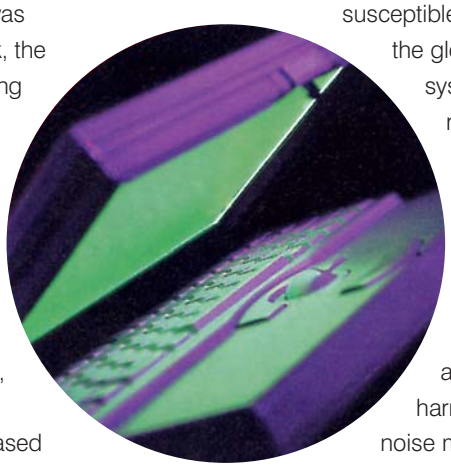
reported to cause autopilot disconnects during cruise. Boeing purchased the computer from the passenger and performed a laboratory emission scan from 150 kHz to 1 GHz. The emissions exceeded the Boeing emission standard limits for airplane equipment at various frequency ranges up to 300 MHz. Boeing participated with the operator on two flight tests with the actual PED, using the same airplane and flight conditions, in an attempt to duplicate the problem. Using even these extensive measures to re-create the reported event, Boeing was unable to confirm the reported interference between the PED and the airplane system.

1998/1997, 767 airplane.

Over a period of eight months Boeing received five reports on interference with various navigation equipment (uncommanded rolls, displays blanking, flight management computer [FMC]/ autopilot/standby altimeter inoperative, and autopilot disconnects) caused by passenger operation of a popular handheld electronic game device. In one of these cases, the flight crew confirmed the interference by turning the unit on and off to observe the correlation. The same unit was used on another flight and on a different airplane, but the event could not be duplicated. Boeing purchased two of the actual suspect units through the airline and tested them in the laboratory, along with three off-the-shelf units. It was determined that these suspect units had emission profiles similar to the off-the-shelf units and that the levels from these devices were below airplane equipment emission limits.

1998, 747 airplane.

A passenger's palmtop computer was reported to cause the airplane to initiate a shallow bank turn. One minute after turning the PED off, the airplane returned to "on course." When the unit was brought to the flight deck, the flight crew noticed a strong correlation by turning the unit back on and watching the anomaly return, then turning the unit off and watching the anomaly stop. Boeing was not able to purchase the actual PED, but contacted the PED manufacturer and purchased the same model. Boeing laboratory emission testing revealed that the unit exceeded Boeing airplane equipment emission levels by up to 37 dB by demonstrating energy levels in the frequency range of 150 to 700 kHz. In the Boeing navigation laboratory the unit was placed next to the FMCs, control display unit, and integrated display unit, but the reported anomaly could not be duplicated.



As a result of these and other investigations, Boeing has not been able to find a definite correlation between PEDs and the associated reported airplane anomalies. For future considerations and investigations, other factors are becoming significant. Qualification levels related to high-intensity radiated fields (HIRF) for new airplane equipment are higher than almost any level of emissions from passenger PEDs. The size of many PEDs is shrinking and, as a result, these units require less power to operate. Though this can increase the margin between airplane system susceptibility test levels and PED emissions, some PEDs are now operating in new frequency bands and are combining multiple functions, making it more difficult to distinguish between intentionally and non-intentionally transmitting PEDs.

Consequently, some airplane systems that have not been reported as being susceptible to PEDs, such as the global positioning system, weather radar, and radio altimeter, may pick up energy from newer PEDs that operate in the high-frequency bands and whose harmonics or other noise may fall within one of these airplane systems' operating bands.

Ground and airplane tests of in-seat power.

Operators have asked Boeing to install and certify in-seat power outlets for passenger use of laptop computers. Boeing and the FAA have three related electromagnetics concerns: (1) whether installing the outlets will increase the use of laptop computers and a corresponding number of potential PED events, (2) whether the power cord will introduce additional radiated emission effects, and (3) whether laptop connections will corrupt airplane power by conducting emissions into the airplane power system.

Boeing certifies the in-seat power system but does not certify or control the power cords and what is connected to them. The in-seat power system is qualified to the same standards as any other airplane system. Sufficient attenuation is required within the power supply to ensure that the conducted emissions from laptop computers are not fed into the airplane power system. In addition to the laboratory tests performed by the supplier, Boeing is required to conduct airplane tests where

the system is fully loaded with laptop computers.

Boeing has tested in-seat power on eight airplanes: two 737s, one 747, two 767s, and three 777s. The number of laptops operating simultaneously in each test ranged from 32 to 245. Included with the laptops were a mixture of compact-disc players and electronic games. Boeing found no airplane susceptibility in these eight tests, though some emissions were found to be extremely noisy in the laboratory (up to 40 dB over the airplane equipment emission limit). The noise levels were above the airplane equipment emission levels from 150 kHz to 500 MHz. Even though these computers did not cause any airplane system anomalies, Boeing has observed airplane antenna receiver susceptibility from "noisy" systems with levels significantly lower than those recorded by the laptop computers used in the tests.

Cell phone tests and analysis.

Boeing conducted a laboratory and airplane test with 16 cell phones typical of those carried by passengers, to determine the emission characteristics of these intentionally transmitting PEDs. The laboratory results indicated that the phones not only produce emissions at the operating frequency, but also produce other emissions that fall within airplane communication/navigation frequency bands (automatic direction finder, high frequency, very high frequency [VHF] omni range/locator, and VHF communications and instrument landing system [ILS]). Emissions at the operating frequency were as high as 60 dB over the airplane equipment emission limits, but the other emissions were generally within airplane equipment emission limits. One concern about these other emissions from cell phones is that they may interfere with the operation of an airplane communication or navigation system if the levels are high enough.

Boeing also performed an airplane test on the ground with the same 16 phones. The airplane was placed in a flight mode and the flight deck instruments, control surfaces, and communication/navigation systems were monitored. No susceptibility was observed.

Telephones installed and certified on the airplane by Boeing or operators are not actually cell phones, but part of an airborne certified satellite system. These phones are electromagnetically compatible with the airplane systems because their emissions are controlled. In contrast, the emissions from passengers' cell phones are not known or controlled in the same way as permanently installed equipment.

2. RESULTING REGULATIONS AND RECOMMENDATIONS

All electrical and electronic airplane systems are qualified to meet stringent requirements for electromagnetic susceptibility. They are tested to well-established limits during various modes of operation and with setup configurations that represent the airplane installation in terms of electromagnetic protection. Sufficient margins exist between the qualification susceptibility test level and the expected airplane environment noise levels. Compliance with these requirements provides a high level of confidence that the airplane systems will function as intended in the electromagnetic environment of the airplane. However, susceptibility can occur in the airplane if an uncontrolled source of electromagnetic energy radiates emission levels above the susceptibility level to which the airplane system was tested or if the airplane system protection has been degraded. In addition, airplane systems with a receiving antenna component have an exception from the susceptibility requirements. The radio frequency (RF) radiated susceptibility test is performed on the system over a full frequency spectrum, but not in the designed operating frequency band of the antenna. No value is gained from performing the RE radiated susceptibility test in the operating band of the antenna because it is designed to respond to signals in this band. PEDs can radiate non-intentional noise within the airplane antenna's operating frequency band, and this can create EMI. Because the basic function of an antenna-based system is to seek and find low-level electromagnetic signals and to respond to signals in a certain frequency band, the probability of interference to these systems is more likely than interference to systems not connected to an antenna receiver.

As a result of these conclusions, recommendations and regulations regarding PED-related anomalies have been established by several agencies, including the U.S. Radio Technical Commission for Aeronautics (RTCA), the FAA, the U.S. Federal Communications Commission (FCC), and Boeing.

RTCA.

The RTCA has focused its attention on airplane system susceptibility with the highest probability of EMI from a PED - namely, airplane antenna receiver systems. (RTCA Document D0-199, "Potential Interference to Aircraft Electronic Equipment

from Devices Carried Aboard," lists the eight conditions that are required for an airplane antenna receiver system to experience interference from a PED.)

The RTCA concluded that the probability of a PED interfering with an airplane receiver system is very low. In the case of an ILS localizer antenna, the probability of PED interference was calculated as one in one million.

Based on the total number of flights per year (determined in 1988), the expected 115 localizer receiver disruption is once in any two-year period.

The first national committee that investigated interference by passenger-carried PEDs was created in the early 1960s. Its activities were initiated by a report that a passenger-operated portable FM broadcast receiver caused an airplane navigation system to indicate that the airplane was off course by more than 10 deg. The airplane was actually on course and, when the portable receiver was turned off, the malfunction ceased. A final report from this committee, RTCA DO-119, was issued in 1963 and resulted in the revision of the FAA Federal Aviation Regulations (FAR) by establishing a new rule (FAR 91.19, now 91.21), which states that the responsibility for ensuring that PEDs will not cause interference with airplane navigation or communication systems remained with the operator of the airplane.

In the early 1980s, media attention focused on in-flight portable computer use and variations in airline policies. Some computer trade publications suggested that their readers avoid particular operators who restricted the use of portable computers. As a result, one operator requested that a special committee be formed to "generate a Minimum Operational Performance Standards document against which manufacturers (of computers and other portable electronic devices) marketing their products for airborne use, could test and label them as meeting this standard in a manner similar to the Underwriters Laboratories Inc. sign of approval." In 1988 a final report was released (RTCA DO-199) that recommended the following:

- Acceptable limits of radiation and associated test methods for PEDs should be established.
- The FCC should specify a new classification for PEDs that may be operated on board airplanes.
- The FAA should initiate a regulatory project to revise FAR 91.19, providing guidance for acceptable methods of compliance and to develop methods to enhance public awareness.
- Standardized reporting of suspected interference by PEDs should be implemented.

In 1992, the U.S. Government requested that the RTCA resolve outstanding questions on PEDs to ensure air safety, specifying that unnecessary restrictions should not be placed on untested PEDs, and to gain an understanding of multiple effects and those from intentional radiators such as remote control devices and cell phones. For various reasons, intentional radiators were not evaluated. In 1996, the committee issued its report, RTCA DO-233. The recommendations are as follows:

1. The FAA should modify FAR 91.21 (previously 91.19), Portable Electronic Devices, so that
a) The use of any PED is prohibited on airplanes during any critical phase of flight.

b) The use of any PED having the capability to intentionally transmit electromagnetic energy is prohibited in an airplane at all times unless testing has been conducted to ascertain its safe use.

2. PED testing efforts should be continued and should include existing and new technology devices such as satellite communications, embedded communications devices, and two-way pagers.

3. A public awareness campaign should be initiated to educate the flying public about PEDs and especially those designed as intentional radiators.

4. More research is needed on the design and feasibility of detection devices.

FAA.

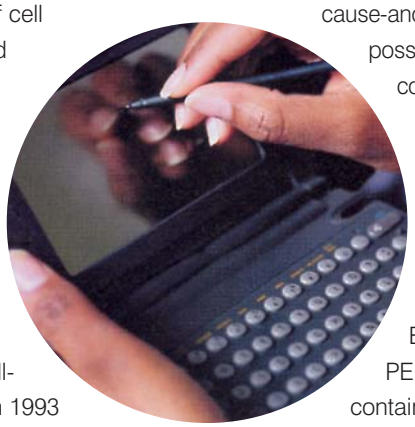
In 1993, the FAA issued AC 91.21-1, "Use of Portable Electronic Devices Aboard Aircraft." This circular provides guidance to the airlines in establishing compliance to FAR 91.21, which provides recommended procedures for airlines and test criteria for manufacturers. For the use of cell phones, the AC states that the FCC currently prohibits the use and operation of cell phones while airborne. The reason for this relates primarily to cellular ground base system susceptibility because a cell phone in the air will have greater coverage (transmitting to several cell bases simultaneously on the same frequency) than a cell phone on the ground (transmitting to one cell base). The

FAA supports this airborne restriction because of the potential for interference to critical airplane systems.

Currently, the FAA does not prohibit use of cell phones in airplanes while on the ground if the operator has determined that they will not cause interference with the navigation or communication system of the airplane on which they are to be used. An example might be use at the gate or during an extended wait on the ground, when specifically authorized by the captain. A cell phone must not be authorized for use while the airplane is taxiing for departure after leaving the gate. The unit must be turned off and properly stowed; otherwise, a signal from a ground cell could activate it.

FCC.

The U.S. Code of Federal Regulations, Title 47, Part 22, Subpart H, "Cellular Radiotelephone Service," Section 22.925, "Prohibition on airborne operation of cellular telephones," states that cell phones installed in or carried aboard airplanes must not be operated while such airplanes are airborne (not touching the ground). When any airplane leaves the ground, all cell phones on board that airplane must be turned off, and the use of cell phones while airborne is prohibited by FCC rules. The use of cell phones on the ground and in the airplane is also subject to FAA regulations.



Boeing.

In addition to its active participation on the last two RTCA committees, Boeing released an all-model service letter in 1993 to provide guidance to operators regarding the use of PEDs. The letter included the following statements:

- Use of intentional transmitters should be prohibited at all times.
- Use of non-intentional transmitters should be prohibited during take-off and landing (critical stages of flight).
- Operation of non-intentional transmitters should be allowed for use during noncritical stages of flight unless the operator of the airplane has determined otherwise.
- Airline procedures should be established for PED termination if problems arise.
- Data should be recorded during a suspected PED-related event.

Boeing has revised its service letter to be in accordance with the FAA AC on the use of cell phones while the airplane is on the ground.

3. OPERATOR ACTIONS FOR INVESTIGATING AND PREVENTING PED EVENTS

Because PED interference is often named as the cause of airplane anomalies, operators should be thorough when confirming a cause-and-effect relationship. Other possibilities should always be considered, including loose cables or other maintenance issues, flight crew activity, and HIRF.

The initial reports that operators submit to Boeing about possible PED interference must contain sufficient detail to allow further investigation, if desired. Follow-up information is difficult to obtain because the passenger and the PED involved in the event are seldom available, details may not have been fully documented, and relevant data may be unknown. To support further investigation, operators should provide the following data:

- Model and make of the PED.
- Identification of peripherals used with the PED.
- Seat location of the PED.
- Operating mode of the PED.
- Name, address, and telephone number of the passenger using the PED.
- Airplane model and tail number or effectivity number.
- Identification of airplane system and description of anomaly.
- Frequency and operation mode of the airplane system, if applicable.
- Length of time between PED shut-off and airplane system recovery, and confirmation of whether the PED was cycled off and on to confirm the cause-and-effect relationship.
- Flight phase and route.
- Copy of flight data recorder output.
- Results of postmaintenance inspection.

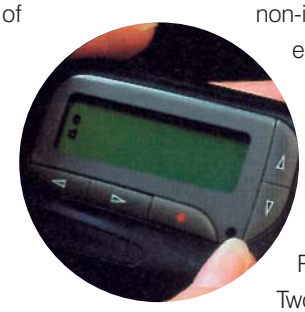
4. ONGOING RELATED ACTIVITIES AT BOEING

Boeing continues to monitor its fleet through reports submitted by operators and to investigate these reports when

possible. The company continues to share its experience and knowledge of PEDs and airplanes with the industry and the public. Boeing is committed to supporting future committee activity and investigations into PED detection devices.

SUMMARY

Passenger-carried PEDs on commercial airplanes will continue to present a source of uncontrolled emissions and as a result may cause interference with airplane systems. The potential is great that PEDs will continue to be blamed for some anomalies regardless of whether they are the true cause. As a result, regulatory agencies and operators continue to offer the current policy for PED use on airplanes as the best safety measure. Most operators enforce this policy, which calls for no PED operation during takeoff and landing, no operation of intentionally transmitting PEDs during any stage of flight, and allowing the use of cell phones at the gate with operator or flight crew approval and with a termination procedure in place in the case of an anomaly. If an operator or flight crew suspects a PED-related event, further investigation can be initiated if key information was recorded at the time of the anomaly. Whenever a PED is suspected as the cause of an airplane anomaly, the operator should also investigate all other potential causes to validate the cause-and-effect relationship.



CATEGORIES OF PORTABLE ELECTRONIC DEVICES

PEDs are classified as either intentional or non-intentional transmitters of electromagnetic signals. Those that intentionally transmit signals outside the device must do so to accomplish their functions. Examples of these PEDs are:

- Cell phones.
- Remote-control toys.
- Two-way pagers.
- Two-way radios.

Non-intentionally transmitting PEDs do not need to transmit electromagnetic signals outside the device to accomplish their functions. But like any electrical or electronic device, they will emit some level of radiation. Depending on the characteristics of this radiation, interference with the operations of other electronic devices can occur. For example, operating an AM radio close to a fluorescent light will cause static in the reception of the radio signal. Examples of non-intentional transmitters are

- Audio players and recorders.
- Compact-disc players.
- Electronic games and toys.
- Laptop pointers.
- Laser pointers.
- Palmtop computers.

Boeing has not been able to find a definite correlation between PEDs and the associated reported airplane anomalies.

In the early 1980s, media attention focused on in-flight portable computer use and variations in airline policies.

Because PED interference is often named as the cause of airplane anomalies, operators should be thorough when confirming a cause-and-effect relationship.

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MINISTERE DE L'EQUIPMENT, DES TRANSPORTS ET DU LOGEMENT
DIRECTION GENERALE DE L'AVIATION CIVILE

Civil Aviation Authority

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European Flight Data Conference: Proactive uses to Enhance Flight Safety Lisbon 19-20 September 2001

This conference for European Operators, Regulatory Bodies and Industry is being jointly organised by the JAA, the UK-CAA and the French-DGAC. The objective is to provide a forum to consider the forthcoming requirements for Flight Data Monitoring along with the consequent managerial and technical implications and the potential safety benefits. In January 2002 ICAO will recommend the use of Flight Data Monitoring (FDM) as part of all operators' accident prevention programmes (for aircraft over 20,000kg) and in January 2005 this will become a formal ICAO Standard (for aircraft over 27,000kg).

An introductory session will set the ICAO and JAA regulatory and operational scene and this will be followed by presentations from the French and United Kingdom regulators on their approach to the implementation of FDM. A range of operators, both large and small, will illustrate how they currently run FDM systems as part of their management of safety risk.

The meeting will then split into two groups.

- The first group is for those just starting to work in this area or have yet to consider the requirements. There will be presentations on the core technical and analytical elements of an FDM system and will allow time for participants to put questions to an experienced FDM panel.

- The second, for the experienced FDM operators, will explore the latest developments in safety management, communications and social aspects plus the regulatory interface. These interactive sessions will be aimed at providing a window on the latest developments and also to obtain operators' views and suggestions for the best way forward to a practicable implementation of FDM requirements.

Feed-back from both groups will be given to the whole conference during the second day along with presentations on data use protocols by IFALPA, Legal perspectives on FDM, the integration of FDM within a Safety Management System, manufacturers' views, implementation on smaller and older aircraft and the way forward.

In addition to being able to talk with current exponents of practical FDM, attendees will have the opportunity to see FDM software and hardware demonstrations by suppliers.

The conference is to be held at the International Conference Centre in Lisbon, Portugal on the 18-20th September 2001. The cost to attendees will be 200 Euros, payable in advance to the JAA.

Details and booking forms can be found on the JAA website (www.jaa.nl) or you may contact:-
JAA, Luz Mendes, Operations Division. PO Box 3000, 2130 KA Hoofddorp, Netherlands
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For further information, requests for exhibition space or offers of assistance in the chairing or expert panel work of the groups, UK attendees may contact David Wright at the CAA's Safety Regulation Group on:-

David.Wright@srg.caa.co.uk or phone (0) 1293 573348 fax (0) 1293 573981

Confusion Reigns

Confusion is still prevalent regarding Radar Advisory Service (RAS) and Radar Information Service (RIS) provided by the Air Traffic Control Service to aircraft operating within controlled airspace in the UK. The following article has been reprinted from Issue 41 of FOCUS in an attempt to clarify the situation. The contents of this article is really important and needs to be understood by all pilots and Air Traffic Controllers.

(Almost) Everything you Wanted to Know about RAS and RIS but were afraid to ask - A Pilot's Guide

Wg Cdr Mike Strong RAF - DAP6

AVAILABILITY

Radar Advisory Service (RAS) and Radar Information Service (RIS) are only available outside controlled airspace. This is not the same as saying that RAS and RIS are available everywhere outside controlled airspace.

Availability depends upon radar coverage and upon the ATC provider being open and having the capacity to provide the service.

At some civil units, controllers provide RAS and RIS as an extra, on top of their primary responsibility for controlled airspace. However, if they get too busy with the latter, they may have to discontinue or change their RAS/RIS provision.

Most military airfields shut over weekends and Bank Holidays. Although this reduces the likelihood of bumping into warplanes, it also means fewer radar units available to provide you with RAS or RIS.

You have hereby identified a significant defect in the UK air traffic system in that radar coverage is not universal and your air traffic service of choice is not always available. However, to remedy this would cost megabucks.

Equally galling - because everyone tends to ask for a RAS in bad weather - solid IMC could be the very time when the controller tells you he is too busy with other traffic to provide you with the radar service you want and need. Joseph Heller called this Catch-22!

APPLICATION

RAS will only be provided to flights under IFR.

IFR is not the same as IMC and, outside CAS, relates only to the Minimum Height Rule and the Quadrantal Rule. Any pilot can elect to comply with these rules.

However, if you are not qualified to fly in IMC, you should only take a RAS if compliance with ATC advice enables you to remain VMC.

Under a RAS:

- Although the controller may pass you information in the form of an instruction, it is only advisory; if you choose not to follow his advice, you become responsible for any subsequent avoiding action. But please let the controller know.
- A controller will aim to provide you with safe separation against other traffic in receipt of a RAS. Life gets more difficult if the other traffic is unknown because he cannot be sure of its intentions; he will try to obtain minimum separation of 5nrn or 5000ft (using Mode C) but circumstances might make this impossible.
- If time permits, the controller will call traffic and suggest action to resolve the confliction. However, if the other traffic is unknown and appears suddenly, he will normally reverse this sequence and pass advisory avoiding action first, followed by information on the traffic.
- If the first words you hear are your callsign followed by 'Avoiding action', you would be well-advised to follow the controller's advice without delay. The threat is immediate!

Under a RIS:

- The controller will tell you about conflicting traffic. It is then entirely up to you what you do with the information. The controller will not offer any avoiding action.
- You remain wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information.
- You must ask if you want the controller to update you on a confliction. Otherwise, he will assume you have seen it.
- Although a controller may provide you with radar vectors, these will not be for the purpose of achieving or maintaining separation.

If you are receiving a RIS and decide that what you really want is a RAS, ask for it. The controller will often accept such a request if his workload permits, and will tell you that you are now under a RAS.
Under both RAS and RIS, please advise the controller before you change heading or level, unless he is already aware that you are manoeuvring. He cannot help you if you do not help him.
Under both RAS and RIS you remain responsible for terrain clearance.

CAVEATS

If you want a RAS or a RIS, you must request it. You will not receive any kind of a service until the controller actually confirms what he is about to provide. In effect, what you are establishing with the controller is a 'contract'.

The act of identification does not imply provision of a radar service.

The following taken from Issue No.59 - FEEDBACK

Investigations into AIRPROX incidents have shown that, on occasions, controllers attempted to provide an RAS when their capacity to offer an effective service was limited by other tasks. In such circumstances an RIS, although more limited, would have been the appropriate level of service.

Similarly, some pilots have an expectation that an RAS will always be available to them, whereas in reality they should plan on the basis that this might not be the case.

If you are not clear about the availability or applicability of RAS/RIS, a copy of a recent article by Wg Cdr Mike Strong RAF - Directorate of Airspace Policy 6 - on this subject is posted on our website with the kind permission of the UK Flight Safety Committee.

Under a RAS or RIS, ultimate responsibility for collision-avoidance remains with you because Class F and Class G airspace is not a known traffic environment and because the controller is only allowed to pass advisory information. This is not a cop-out.

The controller may not be able to provide you with a full RAS or RIS for various reasons, perhaps due to workload or maybe because there are too many other aircraft in your vicinity. He will then limit the service. Once again, this is not a cop-out by the controller. Rather, he is simply being honest with you so that you can take due regard, including increasing your lookout.

IF YOU INCLUDE CONSIDERATION OF ALL THE ABOVE IN YOUR FLIGHT PLANNING, AS WITH EVERYTHING ELSE, YOU ARE LESS LIKELY TO BE CAUGHT UNAWARES.

Managing Stress — the case for a 'whole-person' approach

by Dr Simon Bennett FICDDS

Stresses that originate outside the workplace are as detrimental to pilot performance as those that originate within it. As Campbell and Bagshaw explain, '... clear thinking, free from emotional ... worries is essential for ... the safe conduct of a flight. Accidents ... occur because the requirements of the task exceed the pilot's capabilities, and this is more likely to occur when the effects of life stresses reduce the capacity to cope (emphasis added)' (1999: 136). The 'life stresses' referred to by Campbell and Bagshaw include financial worries, marital problems, ill health within the family, a house move or even an impending marriage — of the pilot or an offspring. According to Campbell and Bagshaw, such events '... can add significantly to the operational stressors [for example, severe weather, crowded airspace, commercially-mandated quick turn-arounds or equipment malfunction] which are part of flying activities' (1999: 132). Of course, such extra-mural 'stressors' affect all occupations and all types of worker, from surgeons to street cleaners, CEOs to telesales staff. However, while the nature of the problem is common to all occupations, the potential adverse outcome(s) in commercial aviation are daunting — a mid-air collision over a conurbation could cost many hundreds of lives (not to mention the reputations of the airlines concerned and of commercial aviation in general).

Stress - fine in proportion

It is important to note that stress per se is not always a bad thing. Indeed, a certain level of stress is a prerequisite for optimal flight-deck performance. In moderation, stress helps to maintain an appropriate level of arousal, which, in turn, ensures attentiveness and rigour. As Campbell and Bagshaw put it, 'Stress ... is nature's way of keeping an individual keyed up for a task, by helping concentration and making recognition of danger easier' (1999: 133). Too much stress, however, can have dire consequences; by causing 'omission' (forgetting to do something), 'queuing' (the incorrect prioritisation of actions), 'filtering' (the complete abandonment of tasks due to excessive workload), 'coning of attention' (a narrowing of the cognitive field) or even 'regression' (reverting to learned/internalised routines that are not applicable to the aircraft currently being flown). The fact that different people can absorb different amounts of stress further complicates an already Byzantine picture.

The stress experienced by flight crew is a function of at least three factors: the crude physical demands of piloting; the requirement to understand and operate increasingly complex technologies in increasingly busy skies; and the need to transition from the work to the home environment to re-create oneself (through, for example, marital and/or family relationships). Examples of physical demands include insufficient and/or poor quality rest, travelling to work (perhaps over long distances through heavy traffic or on crowded and inefficient trains), irregular meals, sitting for long periods in the cockpit and poor environmental conditions (low-grade re-cycled air, for example). According to Campbell and Bagshaw, far from making the pilot's job easier, new technology may have the opposite effect; 'The technical complexities of modern aircraft ... has increased demands on the pilot and led to a steady increase in workload' (1999: 143). The transition from the cockpit and ops desk to the home environment can give rise to what Cooper, Dewe and O'Driscoll term 'work/nonwork conflict' (2001: 49). This article will, for the most part, focus on this stressor.

Work/nonwork conflict - origins

Put simply, work/nonwork conflict originates in the various disjunctures between the activities we undertake to 'earn our daily bread' and the roles and activities we are expected to adopt and undertake in the home environment (however constituted). Given that, as Beaty (1969: 13) explains, a typical pilot '... is forty-three ... is married with two children .. has a detached house ... [and] has a car for himself and a car for his wife' one can safely assume that the norm for most pilots is marriage, children and (assuming that the periodic health and competency checks are passed) relative financial security. However, if Cooper, Dewe and O'Driscoll are correct, the picture is not as rosy as it might appear. The transition from work to home may give rise to 'inter-role conflict', which may, in turn, cause psychological strain, which may adversely affect both home life and job performance. Psychological strain may originate in the first instance in adverse job conditions (for example, excessive workloads and/or poor relations with work colleagues). Such conditions '... can produce negative emotional consequences (reduced self-esteem, feelings of uncertainty, loss of a sense of competence) that impinge upon interactions within the family'. Additionally psychologists have identified qualitative differences in required behaviours (as between work and home) as a potential source of psychological strain. As Cooper, Dewe and O'Driscoll explain; '... the attitudes, values and behaviours required in one role may be incompatible with those needed in another. For example, in the work context an employee may be

expected to be ... hard-driving and task-oriented .... In the home situation, however, being loving, supportive, accommodating, and relationship-oriented may be considered essential to the development of a positive family life' (2001: 49-52). If the pilot finds this transition difficult, stress may result. The act of 'going and being home', far from alleviating stress through physical and/or emotional re-creation, serves only to raise stress levels. This 're-creation-as-stressor' dynamic is both ironic and — given the physical and psychological demands of contemporary commercial air operations — potentially dangerous.

Of course, all we have so far is academic theory. What of real life? Can things really be that bad? Are there 'work/nonwork' and 'inter-role' conflicts? The following statements (culled from a survey of pilots' wives conducted in 1965, but no less relevant for that) would seem to suggest there are. The testimony, if representative, is revealing:

"[He] needs a drink, quiet and solitude to unwind after a trip — impossible with small children who are excited at seeing him".

"Very cross on return from any trip — has a few drinks to 'unwind', during which time any attempt at conversation brings cross, snarling replies".

"My husband's patience with the children is strained, his tolerance of noise very low".

"He has turned from a very pleasant, easy-going person, warm and affectionate husband and father, into a chronic grumbler ... our sex life is none too good now, either".

"No sex life since flying jets. Jumps on children for every little thing".

"Erratic sleep pattern. Feels very tired, but cannot fall asleep on retiring" (all responses cited in Beaty, 1969: 23-24).

Of course, such experiences may not be at all typical. But for those women quoted above there are obvious signs of 'work/nonwork' and 'inter-role' conflicts within the family. It is also worth noting that such conflicts can work the other way, for having adjusted to the emotional and other demands of home/family life, the pilot has to slip back into her/his original mental frame in order to work. As Beaty explains; 'In the space of a few minutes, he [sic] is exchanging his somewhat ambivalent role at home for the leading part in the cockpit ... conscious of his enormous responsibilities [he becomes] rather tense' (1969: 23-25). The above statements resonate with Cooper et al's more contemporary (2001) observations on the problem of adjustment. For example; '... intensive demands from the job may require [individuals] to significantly reduce their input into family life'. And; 'As well as competing for one's time and physical energy, the attitudes, values, and behaviours required in one role may be incompatible with those needed in another' (2001: 50). This latter point may be especially germane to aviation, where flight crew habitually make decisions of enormous consequence. Such a

requirement attracts a particular type of individual to aviation. As a Swissair psychologist has put it; 'We look out for the characteristics of inner stability, flexibility, stress resistance .... Does he [sic] panic? Does he seek excuses for mistakes? Can he work in teams? Can he bear the loneliness of a captain's leadership?' (cited in Barlay, 1997: 111). This latter observation highlights the fact that, in the case of the Captain, the buck stops with her/him. As Beaty puts it; 'The pivot of an aircraft is the captain and round him rotates everything else .... The aircraft, the passengers, the crew, the freight are his total responsibility' (1969: 13). Assuming Beaty's 'captain-as-pivot' observation to be correct, this particular role and resulting psychological orientation may give rise to stresses and strains in other contexts (even though, as mentioned above, flight crew are selected for their 'stress resistance' — at least at Swissair). A further complication is that the ego rewards of flying are qualitatively different to those achieved in home/family life. As Beaty (1969: 16) eloquently puts it; 'A ... captain, looking back at the huge aircraft he has just brought down through fog to a silk-soft landing, has every right to be proud of the disciplined skills which enabled him to do it'. That great aviator Charles Lindbergh understood well the visceral and ego-feeding character of flying; ' ... where immortality is touched through danger, where life meets death on an equal plane; where man is more than man' (1953). Tom Wolfe described the transcendent quality of flying in The Right Stuff; '... to describe it [piloting], even to wife, child, near ones and dear ones, seemed impossible. So the pilot kept it to himself, along with an even more indescribable ... feeling of superiority, appropriate to him and to his kind, lone bearers of the right stuff' (1991: 38).

Speaking from my own experience as a private individual who has flown gliders and an academic who flies jump seat with a commercial airline I can testify to the ego-enhancing, and, one might venture, addictive quality of flying. For me, the act of hurtling through the air at Mach .75 at a height greater than that of Everest with the world at one's feet induces a narcotic effect — I am addicted to it to the point where life on terra firma seems, at least for a few days, deadly dull.

Managing the "work/nonwork" stressor

Assuming the process of adjustment between piloting a prestigious piece of technology and leading a full and satisfying home life to be problematical, the question that needs to be answered is: 'How can the resulting stress be ameliorated or eliminated? Hopefully, recommended 'coping strategies' are today a little more sophisticated than they were in the 1960s, when, as Beaty relates, one stressed pilot was told by the company doctor to 'Drink beer, take drugs or sleep with the stewardess' to ensure adequate rest (1969: 20). According to Cooper et al. the provision of 'social support' may help to moderate the strain induced by the transition from work to home. Social support raises the individual's self-esteem, making her/him better able to cope with stress. There are four types of social support: direct, practical help; showing sympathy for and interest in a person's problems; providing relevant information; and giving regular, constructive feedback on an employee's performance. One psychological model predicts a direct inverse relationship between social support and psychological strain. That is, the more support provided to the employee, the less will be that person's level of work/nonwork-induced strain. As mentioned above, direct, practical help can help counter the stress induced by the work/nonwork transition. (In the parlance of the psychologist such help is generally termed 'instrumental support'). In practical terms this can take the form of what one might term 'whole-person' or 'lifestyle-sensitive' rostering. For the family man with heavy commitments at home, a rostering pattern that takes account of his duties as a husband and father (and, possibly, carer) can be a great help. Writing as long ago as 1969 Beaty noted the potential positive outcomes of this approach, albeit from a 'masculinist' perspective: '[A] pilot's social life is likely to be fraught with problems ... quick, unavoidable changes on the roster make it difficult for him to forecast when he will be at home and when away. The normal social life of his age and income group — the odd party, dance or dinner, the regular Saturday lunch-time session in the local, taken in an easy almost unplanned rhythm by his non-flying contemporaries — require careful planning and calculation. Such occasions tend over the years to become just too much trouble' (1969: 20). This is far from a trivial point, as such activities are a component of efforts to re-create oneself ready for the next bout of flying. Such releases provide, through the maintenance of relationships, for the dissipation of stress. As Campbell and Bagshaw point out, once our 'stress reservoir' is full, performance and conduct can become erratic. Of course, I am not arguing for roster duties to take a back seat. Flight crew, like any instrument of production, must be utilised for the maximum economic benefit of the airline. But not to the point where that level or pattern of utilisation is detrimental to physiological and/or psychological well-

being. As Campbell and Bagshaw explain '... continued stress can create physical symptoms such as insomnia, loss of appetite, headache, irritability etc.' (1999: 130).

The "whole person" approach - not an easy option

Despite the obvious benefits of 'lifestyle-sensitive' aircrew management, I am under no illusion as to the practical problems of implementation. Given the highly competitive nature of contemporary deregulated commercial aviation aircrew must be used in the most economically efficient manner possible. It would be absurd to suggest that aircrew be allowed to dictate if and when they fly. Nevertheless, as Cooper et al. have noted; '[The] demands-control model ... predicts that high levels of perceived [job] control will ameliorate the aversive consequences of excessively demanding jobs' (2001: 151). Monitoring how aircrew are utilised in relation to their non-work circumstances (which will change over time) takes both commitment, skill and effort. Many Human Resource departments, especially those in the smaller airlines, may not be geared up to accomplish this additional task. The 'whole-person' approach is predicated upon some form of monitoring and/or mentoring. There is an obvious cost here — one that 'no-frills' airlines, operating on slim margins, may not be able to meet. Even the larger airlines may find this problematical, given the demise of in-house medical services. Thus we can see that the 'whole-person' approach is not without cost. But before dismissing it as just so much theoretical hot air it is worth considering whether a captain or first officer whose marriage is on the rocks or whose children are delinquent (all family units are susceptible to such problems regardless of religious observance, education, socio-economic status or support from grandparents, friends or neighbours) or who is going to have to catch up (stressed, tired and possibly jet-lagged) with his holidaying family due to a last-minute call-out will be operating at peak physiological and/or psychological efficiency while on the flight deck? According to Wigmore (2001: 51) 'the airline industry is safe — very safe'. Techniques like 'whole-person management' can help keep it that way.

Bibliography

Barlay, S. (1997) Cleared for Take-Off, Behind the Scenes of Air Travel, London: Kyle Cathie

Beaty, D. (1969) The Human Factor in aircraft accidents, London: Secker and Warburg

Campbell, R.D. and Bagshaw, M. (1999) Human Performance and Limitations in Aviation, Oxford: Blackwell Science

Cooper, C.L., Dewe, P.J. and O'Driscoll, M.P. (2001) Organisational Stress, A Review and Critique of Theory, Research, and Applications, Thousand Oaks: Sage

Wigmore, I. (2001) 'Airline safety is no accident', Airliner World, June

Wolfe, T. (1991) The Right Stuff, London: Picador

Biography

Dr Bennett directs the Scarman Centre's distance-learning MSc in Risk, Crisis and Disaster Management at the University of Leicester, England. He has a PhD in sociology from Brunel University, London, and has been published in The Log and other journals. He is a Fellow of the Institute of Civil Defence and Disaster Studies.

The European Aviation Safety Agency (EASA)

by Peter Moxham

It is many years since the regulators of the aviation industry embarked upon the formation of the JAA, and much effort has been put into creating the Regulations under which the JAA performs its various tasks - these years have not been easy for our industry, and politically there have been many problems along the way.

It is tempting to think however that these problems are behind us, but this is not to be the case and very shortly a new organisation will take over responsibility within the EU for all matters relating to aviation safety - EASA.

There are many differences in the way EASA will effect change from the methods of the JAA, not least being that EASA will be a legal entity and therefore, for those in EU member states, their rulings will have the effect of law.

This is no longer a dream, but is rapidly becoming reality, and within the next 18 months will take over control of many of the matters now under JAA and the local regulators, e.g. the United Kingdom CAA. It is too early to know how this will affect day to day matters, but it has already been agreed that the new Agency will take over the responsibility for aircraft certification and design and maintenance organisation approvals. It is anticipated that within a further six months Aircrew and Engineer licensing will have been encompassed and then will follow Flight Operations. At that stage it will no longer be JAR-OPS but EASA-OPS.
Points to remember:

- Unlike the JAA, EASA will have the full force of law, EU states will not need to enact in their own statutes as EU law over-rides national law.
- Decisions taken at EASA will apply uniformly over all member states - there will be no national variations.
- Certification by EASA will mean that, for example, maintenance organisations in one member state can undertake work on any aircraft registered in another member state.
- EASA is a political organisation - reporting to politicians.

How will it work ?

It is anticipated that there will be a central EASA office - the current frontrunners are that this will be in either Amsterdam or Cologne. The office will recruit its own team of individuals to cover all aspects, but it is anticipated that these will largely be recruited from within the staff of existing regulators' offices. It is further anticipated that there will be local EASA offices established in each member state. However all staff will eventually be employed by the new Agency.

The EU will appoint a Director General of the new organisation, and this individual will be responsible for establishing the Agency. At this stage the Agency exists only on paper, and a team of Eurocrats is actually working on its establishment - this team is located in Brussels at the Transport department of the EU. It is very apparent that the Director General will have very significant powers and will himself report directly to the Transport Commissioner.

Unlike the JAA, the new Agency will not have committees and sectorial teams reflecting Industry participation - this will mean that Industry will only be able to influence EASA through the Government Departments responsible - in the case of the UK that means the DTLR. Note this is not the same as the CAA.

It is anticipated that the new organisation will have an Interested Parties Panel, but this will largely deal with matters in retrospect, and not have any say in the formulation of policy.

The link with non-EU states and the rest of the JAA members will be through a redesigned JAA whose sole purpose will be to facilitate between member and non-member states.

Where are we now?

The Council of Ministers has approved the organisation and the target start date is 3rd January 2003. Many in industry may not believe that this is possible, but many politicians and civil servants believe that this date will be met.
It has been stated that the new agency will be 'transparent' and that all changes will be implemented after due consideration of the industry through an NPA procedure. It will be interesting to see how, with no initial industry inputs, this will allow for the new regulations to be realistic and practical.

In the UK we are indeed fortunate and the DTLR working with SBAC, BATA and others has been holding regular consultation meetings - I can find no other EU state which has put such a situation in force ! However the UK is only one voice in a position to have only one vote on issues decided by a majority, and we should all bear this in mind when meeting with our counterparts in other EU states.

Where are we going ?

Whilst the starting point is aircraft certification, it is indicated that rapid progress will be made to take over Flight Crew licensing within about 6 months of inception, and already some of the fundamentals of the JAR-FCL are seen to be in doubt.

It must be remembered that there will be no state adoption problems that we currently see, with less than half the JAA members having adopted JAR-FCL. All EU members have to accept the rulings of EASA. Certain fundamental changes will affect the training of new pilots - in particular EASA will have no interest in regulating private recreational flying and will not therefore involve itself with the PPL. Since many would be professional pilots start with a PPL and progress through modular training to the ATPL, it is not known what the effects will be. There will be significant changes in medical requirements (it is probable that the JAR-FCL 3 Medical requirements document will be completely rewritten)and it seems probable that the approval of FTOs and TRTOs may be rather different to that prevailing today.

Possible problems ahead

The main worry is that there is no industry consultation ahead of proposals being made. Until now, under JAA, industry has had every opportunity to voice its concerns and effect some change before even an NPA was issued. Under the new system this seems unlikely.

As I have said, we in the UK are fortunate in that the DTLR is consulting and does carry our fears forward - I find it very surprising that the same situation does not apply in other EU states.

The system is unlikely to be quick to incorporate change. Anyone who has had to work with the EU system knows that dealings are protracted and difficult. It is very apparent that lobbying in the UK will be essential to effect any change.

The plus side

There will undoubtedly be some plus sides to this change in regulation. For the UK industry, the DTLR genuinely believe there will be reduced costs - the DTLR believes that a common charging policy throughout Europe is a prerequisite of the new Agency - and the CAA will no longer have to cover its costs, and make a profit, as it is required to do at the moment. Indeed the CAA role in the industry will be substantially reduced.

A common certification and licensing standard throughout the EU will make the aviation industry as a whole more flexible and the ability to have parts and modifications applicable throughout will save endless amounts of money being spent in each country on the same product or modification.

Conclusion

It is difficult to come to any conclusions just now - another period of regulatory upheaval is not what is required and the speed with which events are moving is, I believe, a matter for much concern. I would rather see it take a little longer, but with things being right, than a headlong rush into a new arena.

In the UK we have had a generally good relationship with our regulators, even if we do not always see eye to eye - I can but help wondering how we will achieve the same relationship with an organisation run by politicians with few industry advisors. I believe this could be a recipe for a very long nightmare.

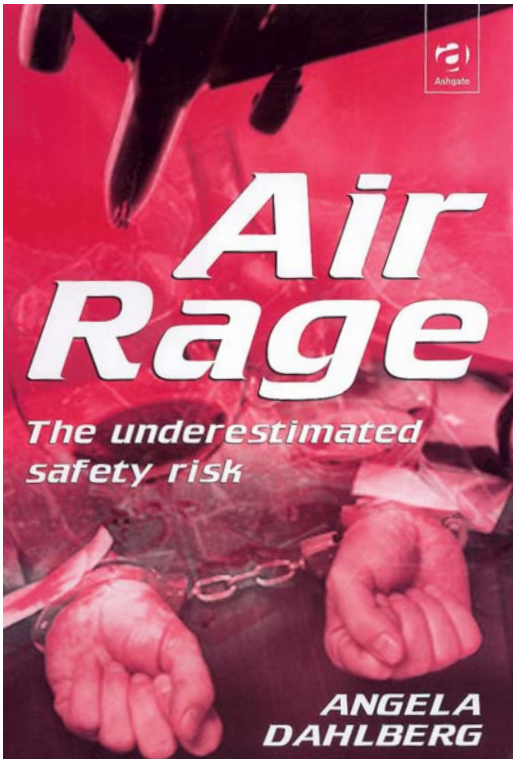
Book Review

Air Rage The Underestimated Safety Risk

by Angela Dahlberg
Published by Ashgate Publishing Ltd
ISBN 0 7546 1325 9
Price £39.95

This book introduces a new Human Factors concept that includes the air passenger as an integral part of the aviation system. It develops a revised Reason Model on Human Error that applies its principles to the prevention of passenger misconduct, with a focus on organizational issues affecting the interface between the air passenger and the airlines. It also builds a synergistic model addressing the traditional conflict between safety and service objectives. Incorporating a diffusion of air traveller tension, a Passenger Risk Management Model leads to a strategic approach for reducing incidents of Air Rage.

- First comprehensive investigation into the phenomenon of 'Air Rage' as a system issue.
- Introduces the concept of passengers as part of Human Factors in aviation.
- Reveals the impact of the aviation culture on the current adversarial relationship with passengers.
- Offers a synergistic approach to the traditional conflict of safety and service.
- Presents original models for analyzing and developing preventive measures for passenger risk management under the control of airline executives.



Training Design in Aviation

by Norman MacLeod
Published by Ashgate Publishing Ltd
ISBN 0 291 39844 8
Price £37.50

Well structured training, based on sound theoretical principles, can transform the system in which high performance is essential and in turn, the organisation. Yet the strategic role of cost-effective training provision is often less well understood than it might be in all branches of aviation - whether civil or regional, general, business or military.

This book analyzes the cycle of training design from the identification of requirement through to measurement of effectiveness. Key issues in training design and management are illustrated with examples and learning is consolidated through case studies. The book provides advice, tools, procedures and examples of best practice - both recent and well-established - to assist aviation training personnel who aim to guarantee cost-effective training. The approach is highly practical, but does not avoid covering the theory when needed.

An informative guide to the process of training analysis and course design, the book examines each stage of the training design cycle in some depth. In addition, it looks at the application of quality management and of project management to training design. Each chapter contains advice and techniques, as well as examples drawn from the author's wealth of experience of training in aviation.

Duke of Kent opens world's largest Aircraft Evacuation Cabin Simulator

The world's largest aircraft evacuation cabin simulator exclusively for aviation safety research was officially opened at Cranfield University 12 July 2001 by HRH the Duke of Kent.

The simulator is funded by the United Kingdom Civil Aviation Authority (CAA) and run by Cranfield University's College of Aeronautics. It will allow, for the first time, trial cabin evacuations to take place in an environment that replicates large wide body and double-deck aircraft cabins. The simulator allows specialists to investigate specific safety issues both for today's wide body aircraft, and those that are expected to be developed in the future, including planned double-deck models that will introduce new issues in cabin safety.

Over 240 people can be accommodated in the simulator, which represents a section of an aircraft. It is 25 metres long by 11 metres wide and 10 metres high, and it has two decks at five and eight metres above the ground. Inflatable slides can be used to evacuate the cabin from both decks. Being a research tool the simulator has a modular structure, allowing the configuration of the cabin and the position of the exits to be changed.

Trials are conducted using volunteers acting as passengers. Cranfield researchers take the part of cabin crew and the 'passengers' are subjected to a simulated emergency that requires them to evacuate the simulator as quickly as possible. Different cabin layouts, stairs and exit arrangements can be investigated to improve the speed of evacuation, which can be crucial in the event of an emergency.

Robin Ablett, Head of Research in the CAA's Safety Regulation Group, said: "The CAA and Cranfield have worked together very successfully on cabin safety for more than 15 years, and the findings have led to improved requirements and safety standards. The new simulator takes us to a whole new level of research and builds on the recognition of the UK as one of the leading authorities on aircraft cabin safety issues. Cabin safety research is co-ordinated on a world-wide basis with the CAA making a major input, and trials are being planned for a number of international studies.

We have been collaborating with our colleagues in Europe, the US, Canada, Australia and Japan for 10 years, and will continue to work closely with them to ensure that our research results can be used to improve safety regulations world-wide. Indeed, representatives from some States in the European Joint Aviation Authorities (JAA) contributed to the design specification for the simulator."

The simulator can be configured to represent a number of different features likely to be found in future aircraft and is fitted with video cameras to gather data on how 'passengers' behave in a simulated emergency evacuation.

Leading the Cranfield team is Professor Helen Muir. She commented: "To increase the realism of the test we can also fill the cabin with smoke. The new simulator will build on our work with our Boeing 737 cabin simulator. The work we carry out at the university has been used throughout the world to improve cabin safety. This new simulator will enable Cranfield and the CAA to remain at the forefront of this area of research."

Both the analyses of the trials and the data gathered will provide valuable input into computer simulations of aircraft evacuations, which could be used when approving new aircraft types.

Speaking at the opening ceremony CAA Chairman, Sir Malcolm Field, said: "In the UK we have a very enviable aviation safety record which is four times better than the world-wide average. However, we must not and cannot become complacent. This simulator being launched today will help ensure that the UK continues to strive for even better safety improvements for air passengers."

UK FLIGHT SAFETY COMMITTEE

ANNUAL SEMINAR 2001

GEARING UP FOR SAFE GROWTH

10/11th October 2001
The Radisson Edwardian Hotel Heathrow

Seminar Objective

This Seminar focuses on evolving safety strategies to meet this forecast growth. Resources like Infrastructure, Facilities and especially Trained Personnel, will need to be committed to provide continued safe solutions.

Programme

10TH OCTOBER 2001

1530 – 1700 Registration
This will take place in the Hotel Foyer

2000hrs Seminar Dinner
with David Hyde - British Airways

11TH OCTOBER 2001

0800 – 0845	Registration
Session Chairman - **Capt.Steve Solomon, Airtours**	
0900 – 0910	Opening Remarks **Chairman UKFSC**
0910 – 0920	Keynote Speech **Rt.Hon.The Lord Clinton-Davis PC**
0920 – 0940	Expansion with Safety **Capt. Roger Whitefield - BA**
0940 – 1010	Regulation and Legislation - Who has the Plan? **Peter Hunt - CAA-SRG**
1010 – 1040	Crisis Resources I - Pilots **Capt. Paddy Carver - CTC Aviation Group**
1040 – 1100	*Refreshment Break*
1100 – 1200	Crisis Resources II - Engineers **Ron Graham - SFT Aviation** **Tony Ingham** **Gp.Capt. Julian Young - RAF**
1200 – 1220	Controller Mathematics 2+2=5 **Kathleen Nuttall - GATCO**
1220 – 1245	Discussion
1245 – 1400	*Lunch*
1400 – 1420	Safety at Airports - Mind the Gap! **Paul Kehoe - London Luton Airport Operations Ltd**
1420 – 1450	Service Supplies - A Challenge for the Future **Florian Preuss - Virgin Atlantic**
1450 – 1520	Legal Summary
1520 – 1550	Discussion
1550	Closing Remarks **Chairman UKFSC**

Delegate Fees (Including Dinner): UKFSC Members £125 - Non-UKFSC Members £250

SEMINAR INFORMATION

- **Hotel Accommodation**

  Hotel Accommodation is not included in the Seminar Registration Fee. A rate of £135 (including breakfast & VAT) has been negotiated with the Radisson Edwardian Hotel. If you require a hotel booking form please contact the Fairoaks office.

- **Seminar Dinner**

  Dress for Dinner is formal.

- **Cancellations/Refunds**

  Cancellations received prior to 21st September 2001 will incur a 50% cancellation fee. Refunds after this date will not be given.

  If you are unable to attend why not nominate a colleague to take your place. If so, please advise the UKFSC Fairoaks office of any changes prior to the Seminar.

SEMINAR REGISTRATION FORM

Please complete one registration form per person (photocopies accepted).

REGISTRATION INFORMATION

(Please print clearly)

First Name: _____ Surname: _____

Company: _____ Job Title: _____

Address: _____

_____

Tel No: _____ Fax No: _____ e-mail: _____

PAYMENT INFORMATION

Seminar Fee: ☐ £125 UKFSC Member ☐ £250 Non-Member

This includes Dinner (10th October), lunch, refreshments and car parking. This does not include hotel accommodation – please see above Seminar Information.

Payment is by sterling cheque only. No credit cards are accepted. Bank transfer is available, details on request (please note an additional cost of £6 will be added to cover handling charges). The UKFSC is not VAT Registered.

Sterling cheques should be made payable to UK Flight Safety Committee.

- Do you plan to attend the Seminar Dinner on Wednesday 10th October? Yes ☐ No ☐
- Do you require a Vegetarian alternative? Yes ☐ No ☐

PLEASE SEND YOUR COMPLETED REGISTRATION FORM WITH YOUR CHEQUE TO:

UK Flight Safety Committee, Graham Suite, Fairoaks Airport, Chobham, Woking, Surrey, GU24 8HX
Tel No: +44 (0) 1276 855193 Fax No: +44 (0) 1276 855195 e-mail: ukfsc@freezone.co.uk

Confirmation of your registration will be faxed to you on receipt of your Registration Form and payment

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