# First FAI International Symposium on Air Sports Medicine.

Report by Dr. Peter Saundby, Secretary of the Commission Internationale Medico Physiologique [CIMP] of the Fédération Aéronautique Internataionale [FAI].

The first ever international symposium on air sports medicine was held in Jerez de la Frontera, Spain over 25-26-27 June 2001. The meeting was arranged to be coincident with the second World Air Games being held in Spain, and also a meeting of the Medical Sub Committee [MSC] of the Joint Aviation Authorities [JAA] which was held in the same hotel. The President of CIMP and instigator of the symposium was Dr. René Maire of Switzerland. The principle organiser was Dr. Pedro Ortiz of Spain. The list of attendees is at Annex 'A'. Copies of all the abstracts are at Annex 'B'.

There was a joint opening session with the MSC. This was attended by Mr. Wolfgang Weinreich, President of the FAI and Mr Max Bishop, General Secretary of the FAI. While the prime aim is the extension of scientific knowledge, another reason was to establish contact and improve the mutual understanding between those doctors working in air sports organisations and those responsible for regulation. The specific issues to be addressed during the meeting were the airworthiness requirements for pilots, licensing, and doping or the misuse of drugs in an attempt to improve performance. The problems caused by over stringent and expensive regulations were causing a reduction in aeronautical activity, but the air sports were a basic resource for all professional aviation. Mr. Jean-Rodolphe Willi, Chairman of the MSC congratulated CIMP on this idea of a common meeting. Mrs Sylvia Diaz, in perfect English, welcomed all those present on behalf of the city of Jerez de la Frontera.

The second session was chaired by Professor Dal Monte from Italy and Dr Pedro Ortiz presented the problems that we would have to solve. We had to accept that the accident rate was far too high and this is demonstrated by insurance exclusions. Human factors were the cause in the majority of cases. He exhibited statistics which showed rotary winged craft to be especially difficult. Amateur built aircraft were twice as dangerous as factory built. Gliders with their low drag and higher speeds could be unforgiving. Even aeromodelling had not been free from fatal accidents. In aerobatics human limits were being reached. The first step was to collect data. What cannot be measured cannot be managed. Research had indicated many improvements, safety cells, ballistic parachutes, seats and harnesses, helmets, safety simulators. Training would improve human performance. Regulations could be counterproductive, but the validation of pilot licensing, the currency requirements, maintenance rules, and in our own field, competition rules all influenced safety. Prof Dal Monte then showed how physiological parameters could be measured in the air, [though some marvelled at his ability to induce charming young ladies to become experimental subjects]. Dr Huber gave an account of an accident to a Swiss Air force F18 from pilot disorientation which demonstrated a possible problem with the Head Up Display [HUD]. Any new method by which information is provided to the pilot will require dedicated training. He would not recommend a HUD for lower performance aircraft. Dr Tony Segal gave an account of an accident to an ASW 19 sailplane which dived vertically into the ground. The survival of the pilot confirmed the effectiveness of the cockpit safety cell in protecting the torso, although injury to the legs occurred together with the destruction of the nose cone. Lastly Prof Dal Monte returned to the difficult problem of doping. Military use of amphetamines in World

War 2 had proved disastrous. More recently, misuse of anabolic steroids had caused serious adverse long term side effects in athletes. In competitive sport, doping always goes faster than antidoping measures. The latest drugs are misused by athletes. Some drugs can be very active, but extremely dangerous. In discussion it became evident that some air sports had developed the cultural use of recreational drugs and this would have serious flight safety implications.

The third session was chaired by Dr Oldrich Truska. Unfortunately Dr Dosel was unable to be present, so Dr Truska presented his paper on the Aviation Medicine Centre in Prague. Recently this has been modernised and is used by both civilian and military personnel. The Centre possesses three hypobaric and one hyperbaric chamber. Oldrich explained the various schedules in use, ear ventilation, hypoxia training and experience of rapid decompression with partial pressure breathing. Monitoring methods and some problems were presented. Dr Rios then explained the planning required for a high altitude balloon flight to FL420, to be followed by a parachute jump from that height. Dr Milos Sokol presented fifty years of pathological investigations in the Czech [and previously Slovak] republics. Originally military, in the 1960s there was an extension to include civilian accidents.
This exposed problems of alcohol in sports pilots, and now there were increasing problems associated with the advancing age of pilots. The methods used were an inspection of the crash site, an autopsy and laboratory tests. In later discussion, the symposium supported the concept of standardised accident and incident reporting. Dr. Kazuhito Shimada, a new member of CIMP described air sports in Japan. Para and hang gliding are major sports, but conventional gliding is limited because landing out is restricted and can be difficult. There is debate in Japan on the training and medical control desirable or required. Lastly Dr Janusz Marek presented problems that had been investigated in aerobatic pilots. Spinal symptoms were common, arising from the severe loadings imposed by the aerobatic manoeuvres. Pre flight spinal massage and conditioning exercises had both been shown to be effective. The exercises consisted of backwards and forwards somersaults.

After a short break the fourth session continued under the Chairmanship of Dr. René Maire. Dr. Stepanek Frigg described a case of severe vertigo following a scuba dive to 28 M. The differential diagnosis was either barotrauma or decompression sickness. This pilot was shown to have a patent foramen ovale which had allowed trans septal gas bubble transfer and caused the neurological symptoms. He subsequently underwent a transcatheter occlusion of the septal hole. Dr René Maire presented two cases of myocardial infarction with stenosis shown by angiogram. He argued that the prognosis cannot be assessed by the degree of stenosis, but that the type of lesion is more important. The JAR 3 Medical manual cardiology section on angiography should be amended. [Later he presented this to the MSC and his proposition was accepted].

On the second day, the morning was devoted to Hang and Paragliding accidents. Dr Alan Gibson showed that there is a serious accident rate. In hang gliding the injuries are mostly to the head and upper limbs, while in paragliding the back is more at risk. Lesson are that full face helmets should be worn at all times, there must be an adequate landing area, high stalls are dangerous and if landing with excess speed, to let go of the control will reduce the likelihood of arm injury. In paragliding many accidents occur from obstructions, wires or trees. There was no relationship with type of launch or age of pilot, but female students suffered a higher rate of injury. Unplanned landings were especially hazardous and often arose from inexperience. The injuries were usually to the lower limbs and back, there was no case for full face helmets which inevitably reduced vision. Dr Trousset cited French experience showing that back protectors were

effective in reducing spinal injuries. The Fédération Française de Vol Libre [FFVL] had 23,000 member and suffered 4/500 accidents a year. In 1996-99 there had been 364 spinal injuries among which 15 suffered neurological damage. A detailed analysis showed that pilots were reluctant to use their emergency parachute. A comparable analysis by Dr Alan Gibson of the UK experience showed similar findings. Paragliders suffer more accidents than hang gliders. Among paragliders 1:150 will suffer back injury, mostly in unplanned landings. Prevention consists of training, use of parachute landing techniques, physical protection of back and side. Stability and control of parachute aerofoils. A review of outcome after injury showed that 98% returned to work, 58% returned to flying and this varied little with experience. There was then a presentation by Dr Bourelli of experimental work to improve back and side protection for pilots of paragliders. This showed high speed video recordings of drop tests using instrumented dummies. Dr René Maire presented two cases of pilots with cardiac arrhythmias, a case of benign supra ventricular arrythmia and another with bundle branch block probably following an asymptomatic myocardial infarction.

Following a coffee break, Dr Colm Killeen took the chair for the sixth session and Dr Robert Staffen gave a most comprehensive presentation on the hazard from malaria. He explained where the disease was endemic, a statistical risk of infection existed and the precautions had to be taken. He emphasised traditional measures to avoid being bitten by vector mosquitoes. The wearing of clothing, insecticides and repellents, mosquito nets and air conditioning. He guided us through the complexities of chemoprophylaxis in various areas of the world and balanced the relative risks from infection or side effects. He gave practical advice on self treatment.

In the afternoon we moved to session seven under the chairmanship of Dr. Eero Vapaavuori. Following the morning presentation a video of various hang and para gliding accidents was shown which reinforced the value of advice given. Dr. Juergan Knueppel opened this session with a fundamental review of human performance limitations. Should this knowledge be promoted? How can the information acquired by professional pilots be passed to recreational pilots? Do we adapt this expertise to meet the needs of air sports pilots? How can we involve the specialist who also take part in the sports? There are few publications outside the English language. The problem has to be resolved because accidents occur from lack of knowledge. This was followed by Dr. Oldrich Truska in which he examined the introduction of the JAA Class 2 to the Czech Republic and compared the examination results of AMEs with those of the Aeromedical Centre. AMEs were less likely to make a diagnosis. He advocated examination by specialist ophthalmologists of private pilots over the age of 40.

Lastly Dr. Peter Saundby recounted the experience of the British Gliding Association. Originally with no medical regulation, the BGA suffered a bad accident in 1967 to a dishonest and epileptic pilot who killed himself and a pupil despite holding a valid private pilot medical certificate. This led to a new approach to the assurance of pilot fitness in which prime responsibility was put upon the individual pilot. Medical advice is available to assist the pilot in making decisions and medical validation is required to preclude dishonesty. Less fit pilots are restricted and prevented from carrying pupils or passengers. After some 1/3 million pilot years, and 4.5 million flying hours, this system has been proved to be as safe as traditional methods based upon clinical examinations. The symposium then adjourned for the CIMP annual formal meeting. The minutes for that meeting are published separately.

On the third day, the ninth session was chaired by Dr. Peter Saundby. It was entirely taken up by a very detailed presentation by Dr. Jon Jordan, Federal Air Surgeon of the United States. After qualifying in medicine he studied law, graduating in both with academic distinction. After service in the USAF he joined the Federal Aviation Administration in 1969 for a short experience. Contrary to his own career plans and job offers, he has remained with the FAA. He sees himself as an advocate for the airman, but to fly safely. The numbers are large, the FAA is responsible for some 230,000 professional pilots and 380,000 private pilots. In addition Air Traffic Control Officers and Federal Marshals are included. Flight attendants and pilots of gliders, free balloons and ultra lights are not certificated, although consideration is being given to these recreational pilots. The commonest reasons for disqualification remains cardiovascular disease, but also neurological and psychiatric. The basis of assessment is a clinical examination at prescribed intervals. Compared with the JAA, few special screening examinations are required. Borderline cases are considered for a waiver and a reserve power exists for the Federal Air Surgeon to find any condition disqualifying. Opportunities for appeal, both medical and legal, exist all the way to the Supreme Court. There are some 6,000 AMEs and last year 463,000 applications were received with 11,000 problem cases. Special problems exists with drug or alcohol dependence. This is usually dependent upon peer identification and a policy of rehabilitation rather than denial of certification exists. Random screening for drugs or alcohol is used to detect cases and deter misuse. Considering some special conditions, monocularity has been disproved as a hazard, numbers of both commercial and private pilots are flying with one eye. After initial doubts, limited certification of diabetics has proved safe. AIDS/HIV is commonly undisclosed but has been treated sympathetically. A few heart transplant cases were once certified but experience proved unsatisfactory. Other transplant recipients have been certified. Accident statistics show that disease is an infrequent cause, about 1% and many of those are due to alcohol. In the USA, people are prepared to challenge the government and pilots cannot be grounded without good reason. Only about 0.5% of applications result in a denial of certification. The government administration changes after elections and is sometimes pushed by political pressure groups in a direction, which may prove medically unwise. The overall policy is not to write the rules too tightly and then consider borderline cases individually. After a discussion in which the Hoover case was mentioned, the meeting closed for coffee.

Following the break Dr. John McCann took the chair for the tenth and last scientific session. Dr. Bernhard Schober presented are short paper on the need for haemoglobin testing to avoid problems with anaemia or haemoglobinopathies. Dr. Peter Saundby developed his radical proposals for pilot responsibility by establishing the minimum requirements and showing how these can be proven by a combination of instructor assessment, pilot declaration and validation of this for honesty by a doctor with access to previous clinical records. The ability of a periodic medical examination to detect previously unknown disease is small. Short term illness, fatigue and alcohol or drugs must be a pilot responsibility. Reassessment after serious illness is important. Those elements of medical fitness which are predictors of success in training or predicate a long life should not disbar individuals from spending their own money on recreational flying. Pilots with some disease process, but who meet driving licence standards should not be responsible for others in the air but may continue to fly. This removes most external risk while retaining their experience. Unchanging disabilities are best evaluated by a suitably trained flying instructor. These concepts have been advocated for recreational pilots in the UK.

The last session was held jointly with the MSC and chaired jointly by the Americans, Drs, McCann and Jordan. Dr Annette Ruge described the structure and operation of the MSC since establishment by the Cyprus Agreement of 1990. The task was to develop and introduce JARs. The functions were rule making, implementation, standardisation and harmonisation. It was a JAA task to define the rules and a national responsibility to implement. The internal organisation was changing from the current committees to sectorial teams. It was probable that the JAA would be absorbed into a new European Aviation Safety Authority [EASA] from 2003. Dr Annettje Roodenberg, secretary of the MSC described how the aim of the Class 2 regulations was to improve aviation safety. The MSC consisted of the Chief Medical Officers of [now] 24 countries and observers from international organisations. The regulations had to comply with ICAO and establish precise and detailed requirements with no room for interpretation. The 1% rule [risk of incapacity] applied to both professional and private pilots. It was more stringent than ICAO required. In the absence of epidemiological studies, a policy of harmonisation was followed. Cultural differences between countries existed, especially in relation to screening tests and evaluation by specialists. JAR 3 Med had been issued in 1997 and reissued in 2000. It had been suggested that the MSC adopt FAA rules but in Europe no single authority existed and no centralised information was available. Answering a question, she said that representations from any source would be considered by the MSC. The Chairman of the MSC, Mr Jean-Rodolphe Willi followed, stating that now ten out of twenty four states were certified as complying with the JAR. He explained that an original intention was not to harmonise private flying but many countries saw it as the first step towards a commercial licence. There was no intention to harmonise licences for balloon or glider pilots. a JAA PPL would only be required for international flights, a national PPL being acceptable within nations. The JAA considered the ICAO Annex to be a minimum and that within the JAA there should be a higher level of safety. Dr Tony Evans then outlined the plans for a UK National PPL. This would have a reduced flying initial flying training syllabus but differences training would be required for any advanced aircraft features. A maximum aircraft weight limit of two tonnes would apply. The medical fitness would be assured by a pilot declaration endorsed by the general practitioner with access to the clinical notes. This was to prevent the concealment of disease, a problem that had been associated with accidents and has been the subject of a formal recommendation from the Air Accident Investigation Board. The medical standard, with some minor variations, would follow the Group 2, professional driver requirements. Pilots who were to some degree unfit but met the private Group 1 standard could fly, but only solo or with another pilot. A panel discussion followed in which there were complaints concerning the failure to cross recognise licences. It was pointed out that with the military members of NATO, cross recognition had long existed. The Canadian class 4 was mentioned as a solution to the problems of recreational pilots. Finally Dr. Colm Killeen, as the senior President of Honour, thanked all, especially Dr. Jon Jordan and all who had worked so hard to establish the symposium.

The conclusions and recommendations of the symposium were:

1. This symposium has proved a positive experience in sharing knowledge of air sports medicine with the aviation regulatory authorities. FAI CIMP would favour another symposium in association with the next World Air Games.

2. FAI CIMP aims to reinforce communication within the field of airsports. To enable the application of medical knowledge originating from other sources in order to establish practical guidelines for airsports participants.

3. Within air sports medicine, relatively few scientific papers have been published. There is a need to improve data collection, especially from accidents and incidents, recorded in a simple format, which allows international comparisons.

4. The air sports organisations need to work positively with regulatory and administrative bodies, both national and international. This should be pursued using scientific evidence, but recognising differing regulatory concepts.

The social functions, while not part of the symposium, should be recorded because they offered an opportunity for delegates to the MSC and doctors representing air sports to meet. It is hoped that this will help defuse some of the antagonisms and conflicts, which have arisen in the wake of the implementation of the JAR 3 Med.

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