

Air Rage? Prevention, Detection and Prosecution

Aviation 2000

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In recent years the incidences and severity of passenger interference with cabin crew members have increased dramatically.

American Airlines reported 140 assaults on Flight Attendants alone in 1995. This equates to a 33% increase over the previous year. United Airlines has also reported an increase in the number of verbal and physical assaults on its cabin staff, increasing from 77 to 94 during the same period.

In 1999 we saw a number of potentially dangerous and certainly costly incidents of passenger violence. In a much publicised story, 12 passengers who were deplaned at Norfolk, VA, following rowdy and threatening behaviour, although most of them were subsequently acquitted due to lack of substantial evidence against them.

In recent incidents over the past few weeks, a perpetrator of Air Rage who was trying to gain entry to the cockpit during flight was subdued by flight attendants and other passengers, and died as a result of their efforts.

In a separate incident, a passenger actually managed to break into the cockpit, and stabbed both the pilot and co-pilot with a pen-knife before being stopped.

It is surely only a matter of time before an aircraft is brought down due to an Air Rage incident.

An analysis of the problem by Northwest Airlines, revealed that intoxication was the cause in approximately 25% of all cases. Possible solutions cited include providing specific alcohol and drug related 'Denied Boarding' guidelines for Check-In and Gate Staff, and printing caution notices in in-flight magazines and ticket wallets.

Air Rage Cocktails

The airlines could stop serving alcohol during flights, and stop selling duty-free alcohol. While this may serve to reduce the problem, it is unlikely to eliminate it altogether, and would, of course, severely affect airline profitability.

What can be done?

So what is done elsewhere where rowdy, and violent behaviour threatens public safety, for example in bars and nightclubs. Mainly, these establishments employ security whose job it is to overpower any troublemakers. Would this be a reasonable solution? Would the travelling public accept the replacement of Flight Attendants with muscle bound "bouncers"? It would be a brave airline to be the first to take this course of action.

In other circumstances, video cameras are employed to record areas that cannot be under surveillance at all times. Video recordings of the cabin area on a commercial aircraft would establish without any doubt what happened, and who did what to whom.

The recordings would also serve to prevent any legal action by the passengers claiming wrongful identification, and would have established the exact chain of events leading to the incident.

Overt video cameras in the cabin area would act as a deterrent to the potential offender, letting him know that he will be accountable for his actions.

The video pictures, either recorded or live, would be able to be made available to the flightdeck crew, allowing them to monitor passengers behaviour, and be warned of potentially dangerous situations. This will allow them to be able to take informed decisions about actions or diversions, without putting themselves and the aircraft in danger by entering the passenger cabin.

The video information could be used to bring legal proceedings against the offender, and would be able to be used to help train cabin crew to deal with violent passengers.

Courtroom use of video recordings.

Over the past few years, video has become an accepted and well used tool in the prosecution of thieves and muggers on the streets.

The presence of video cameras in town centres, shopping malls, and even in the corner store, has become accepted and even expected.

The legal position in respect of evidence must however be explored if widespread use of video cameras on international flights is to be expected. The following study specifically concerns the experience of use of digital video recordings in the United Kingdom, which probably has been using video in the courtroom for longer than any other country. Laws may differ throughout the world, and the specific UK experience would have to be compared with the legal process in various countries world-wide before the position could be seen to be "watertight". However the principals seem sound, and it is probable that any inconsistencies will only be brought out when tested in court.

The essence of any evidence to be used in court is that it must be proved to be original, or a certified true copy. The weight and credence given to any piece of evidence to which an audit trail cannot be attached, is in doubt from the start. This does not make such evidence inadmissible, but the judge will direct the jury to use caution when working with such evidence.

In 1998, the United Kingdom government set up a Parliamentary Select Committee, to discuss the merits of using digitally recorded photographic and video evidence in court.

They were initially concerned with the ease with which digital images can be manipulated using cheap, readily available software packages. They also defined the "original" of an image as being that electronic copy created on the imaging chip at the moment of exposure, which means that all electronic storage, on hard drive, RAM memory, and the like, is considered as a "copy". While this means that the subsequent copying and distribution of electronic copies of the image has not affected its legal status, it does mean that to have true weight in court each copy must be certifiably a true copy of the original, with a method of proving that no electronic alteration or enhancement has taken place.

Technically this can be achieved by a process known as "Watermarking". In this process, first developed by IBM to help copyright owners monitor the use of their material, a watermark is

hidden within the coding for an image or part of an image. If this image is in any way modified, the watermark is destroyed, and the copy is no longer certifiably the same as the original.

Furthermore, if the watermark were applied across a sequence of digital video images, then if the sequence were disrupted by the inclusion of a new frame, the removal of a frame, or by any frame within the sequence being altered, again the watermark would be destroyed.

To give even higher evidential value, someone who can be held accountable, for example the aircraft pilot, should secure the recording as soon as practical after the incident. He must then retain this until it can be passed to the proper authorities.

Aerospace Standards.

To withstand the harsh aerospace environment, all components need to be designed and manufactured specifically for use in that environment. Taking standard off the shelf cameras and recorders designed for the office environment and using them in the air, while economically attractive, will result in early problems and failures. Specifically, externally mounted cameras need to be small, light, and reliable using solid state electronic shuttered light control, thermostatically controlled heaters for de-misting and de-icing, and aerodynamically shaped housings to allow the flow of air to remove water droplets.

The Video Camera.

The worldwide use of video cameras for buildings and area security is now well established, with thousands of cameras being installed weekly. This mature technology is now leading to highly reliable solid state CCD camera sensors, at ever-cheaper prices and in ever-smaller physical sizes.

Camera observation has now become an accepted part of modern life. The modern businessman uses camera technology to conduct "video conferencing" with international offices. Mostly, then, we have come to accept the presence of cameras in our daily lives, and are no longer intimidated by the idea that we are being recorded going about our business.

Indeed, most of us welcome the increased security afforded by town centre police surveillance cameras, and point of sale cameras which check that we are who we say we are, every year preventing millions of pounds in fraudulent transactions. In many instances, video tapes are used for training de-briefing (for example in line-pilot's simulators), and can also be used to confirm that the correct actions were taken by staff, for example

showing that procedures were correctly followed when in dispute. Taken together, the advent and introduction of video cameras into any workplace, including the cockpit, should not be feared, but should be welcomed.

Solid State Recording vs Tape. Tape based systems have traditionally been used for video recording for flight trials and other airborne work. When considered for air accident investigation uses, the medium has serious shortcomings.

Wear. In a system in use 24 hours a day, the requirement for maintenance to replace worn tapes is relatively high, resulting in high "cost of ownership" for the airline. A solid state digital system needs no such maintenance.

Quality. With a high frequency, wide bandwidth signal like video, the quality of recording on tape systems soon deteriorates with usage, most experts recommending that a VCR cassette be used no more than 10 times. A digital system, using flash memory with an expected life of 200,000 write cycles, would reduce this maintenance to a minimum.

Flexibility. Perhaps the biggest advantage of digital systems over tape based systems, however, is the ability to rapidly access a particular image or sequence of images. A tape system is essentially a serial device, where a user has to start at the beginning and progress through the recording until reaching the required sequence of images. With a digitally controlled system, a sequence of images can be accessed easily either by time, or alarm. This could mean that an alarm could be noted by the digital system, for example: on a fire alarm; pilot initiated alarm; when the aircraft altitude falls below 10,000 feet; or whatever the air accident investigators require. Then this section of recording could be easily accessed during analysis.

Further to this, uniquely in a digital recording system, the alarm action can cause a change in the way that the recorder works. For example, this could mean that as the aircraft descends prior to landing, the recorder starts to record at higher resolution or with a faster update rate.

Under normal circumstances, the recording will overwrite once the medium is full, after say half an hour of recording. Again, given a digital alarmed system, it would be simple to program the recorder to preserve the recording say one minute prior to, and one minute following an alarm, thus ensuring that vital

information is not overwritten however long the flight continues after the incident.