Airline passenger management systems

Difficult times can call for drastic action, and the use of technology to reduce the probability of terrorist attack is still ongoing. *Aircraft Technology* reviews the latest in anti-terrorist cabin security measures — the 'airline passenger management system'.

The tragedy of 9/11 has led to many changes in the way regulators, airlines and airport security systems operate. To travel anywhere by air today, passengers must arrive at the airport at least 90 minutes before departure and join long lines to go through security. This may be made worse by embarrassing body searches and numerous delays.

With this inconvenience comes new technology aimed at making the airliner a more secure and safer place. A new system which has recently received a US patent is the 'airline passenger management system' (APMS). It is a system designed to manage, control and monitor the activity and movement of passengers within the aircraft cabin during flight. In some cases the APMS can restrain the activity of particular passengers.

The primary purpose of the system is to protect passengers from on-board terrorist attack but it can also function as a safety system during other aircraft emergencies caused by mechanical failures. The information provided to the crew also contributes to increased productivity and efficiency during flight.

The nature of the APMS has resulted in the identification of other value added services which can optionally be delivered to passengers in flight. For example, the small console located above the passenger tray directly in front of each passenger might also be used for checking/sending electronic mail, gate number of connecting flights, weather information, flight schedules and most of the services currently provided by internet service providers such as AOL, Microsoft and so on. On longer flights, educational and investment services along with entertainment may be provided. There also appears to be an opportunity to market goods and services to passengers via the same system.

The APMS consists of a microprocessor-based computer located in the cockpit. Appropriate database and networking software is hard-wired to each passenger seatbelt. The redesigned seatbelt, or 'smart belt', contains a latch assembly in the belt buckle. This latch assembly, when actuated by the computer, locks the belt so the passenger cannot unfasten his seatbelt. The computer also receives signals from the belt indicating whether the seatbelt is fastened, unfastened, or loosely fastened. A sensor in the passenger seat also provides the computer with data as to whether the seat is occupied, and whether an adult or a child occupies it.

The small flat screen console, above the seat tray reflects flight and seatbelt locking information so the passenger is kept informed. When passengers desire to move around the passenger compartment, they can inform the computer by simply pressing a button on the console. The computer will grant permission to move about, or indicate when it will be possible to do so using a verbal or text message.

Since a database management system operates the APMS, the computer can make value judgments on each passenger request so that more than one high risk passenger is not moving around the passenger compartment at the same time. The kind and scope of profiling done by the system will be determined by security conditions in effect at the time of the flight. All data regarding passengers will be loaded into the computer by ground operations when the aircraft is loaded and ready for takeoff. It is important to remember that under 'normal' conditions of threat, the locking feature of the 'smart belt' would not be used. However, passengers may still be asked to request permission to leave

their seats for their own comfort and convenience.

The system also provides wireless hand-held devices for flight attendants to use in monitoring passengers and for communications with ground operations and the cockpit crew. All database information regarding the passengers will be available to flight attendants so that they may better understand the behaviour of passengers.

The passenger compartment will also contain large flat screen panel(s) which will be colour coded to reflect the status of each passenger and his belt. This will make it easy to monitor safety during takeoff and landing, and the movement of passengers during flight. Additional safety and security monitoring is provided for lavatories.

The proposed APMS has four security modes:

1 Normal condition (or normal mode): The APMS monitors and reports passenger seatbelt fastening status and passenger seat occupancy.

2 Low-risk mode: The APMS seatbelt locking device is turned to lock during specific phases of flight such as during takeoff and landing. This mode might also be selected when operating in airspace which is in close proximity to important buildings and unlocked after the aircraft leaves this airspace.

3 Moderate-risk mode: The APMS manages seated and unseated passengers during the cruise or straight and level part of the flight. Seatbelt locks are turned on for the duration of the cruise part of flight, unless a passenger requests to get up. The APMS looks at its database to see how many people are already up and what the risk level is for the passenger requesting a an unlock. The APMS will either unlock the seatbelt lock or request the passenger to 'wait in line' until other passengers return to their seats. A passenger who is denied an unlock can also request the immediate attention of a flight attendant.

4 High-risk mode: During any phase of flight the APMS monitors the activity of the high-risk level passengers and does not allow two or more of high risk level passengers to have unlocked seatbelts at the same time. The APMS, using artificial intelligence programming and its database, analyses the threat level of individual passengers. If two high risk level passengers request to get up within a prescribed or programmed time frame, or at exactly the same time, the APMS will only let one passenger up. The passenger denied the unlock will be shown a 'wait' message although they still be able call the flight attendant and ask for an unlock.

Although APMS may be an effective way to thwart a terrorist attack, some may see it to be an invasion of privacy, which curtails many freedoms enjoyed by the flying public. Also, in the case of an emergency it may actually create a very unsafe situation as far as egress from the aircraft is concerned. It will be up to air carriers and regulators to assess whether they wish to accept this technology in their war against terrorism.