been introduced and are being tested by interested European airlines. The Sicma Aero Seat 625 and Aviointeriors Chameleon feature an innovative worm-drive in place of the mechanical latching system of other CVS, such as the Keiper Recaro CVS and the new variable-geometry seat, developed by BEA. Sicma was the first company to introduce the worm-drive system, which entered trial service on two MD-80s with Austrian Airlines and Swissair in January. Burns Aerospace will soon be launching its new, lighter, Selectus convertible, but has not yet finalised its operational system.

The manually or electrically operated wormdrive models differ in that the seat expands or contracts to the required width like a concertina. With the mechanical latching system, only the space between the arm- and backrests is increased. The concertina principle provides increased width of the seat pan and back cushions in the expansion process. On the Sicma 625, spring-loaded wings extend from the central backrest to fill the space.

Every movement of the 625 and Chameleon, introduced by Rome-based Aviointeriors at this year's Paris air show, is controlled by a single shaft, with seat pans, backrests and armrests mechanically linked. Adjustments are activated via a handle and require no skill by the operator. Full motorisation, with a central control panel located in the cabin-crew compartment where the flight attendant can select the number of rows to be converted, is available as an option on both models.

The Chameleon triple-reducing seat, for example, can be converted from a three-seat 432mm economy configuration into a two-seat 483mm business-class arrangement in under 20s. It is aimed at the US market where passengers are more used to first-class comfort. So far, only US Air has installed the CVS.

The CVS is clearly a compromise, and European airlines seem prepared to live with it more easily than their US counterparts. Some minor problems still have to be ironed out in terms of comfort levels, but at least two manufacturers are vying for the prize for the most innovative "comfort gadget".

BEA is offering the Backcycler CPM electric lumbar-support system developed by the University of Vermont. It consists of an air pad which inflates and deflates every 2min, acting like a massage on the lower back, reducing stiffness and fatigue through flexing the spine. Keiper Recaro's new first class sleeper seat introduces a comfort-management system which uses a smartcard to memorise the optimum seating position for each passenger.

**FOOD FOR THOUGHT**

In addition to being entertained in comfort, the passenger needs to be fed and watered to round off the quality air-travel experience. This is nothing new, but manufacturers of galley equipment now provide greater assistance to airlines, helping them in their efforts to add variety and imagination to their inflight-catering service.

The days of dried-out food could be numbered if a new steam oven offered by BEA's Galley division, and being tested on board Swissair aircraft, delivers all it promises. The manufacturer claims that the steam oven—which is capable of preparing up to 32 meals—will reduce cooking time by 30% over conventional methods.

The Steamer Oven weighs the same as a standard convection oven and has several interesting features, including self-diagnostic electronics, low exterior-surface temperatures and low operating pressure for enhanced safety.

EA has a range on some of its competitors by being able to offer Espresso and Cappuccino, dispensed from a rail-mounted machine which is interchangeable with other coffee makers; a service also recently introduced by BEA.

C & D Interiors, on the other hand, is going downmarket, developing a range of low-cost inserts—coffee makers, ovens and refrigeration equipment—for those airlines which do not require highly-sophisticated systems for the preparation of food and drink.

**FAA in the hot seat**

The controversy over the FAA's 16G seat-certification rule continues to rumble on. It was introduced in FAR 25.562 Amendment 25-64 as long ago as 1988 and adopted in March 1992 under technical standard order (TSO) C127 for all new commercial aircraft.

The major bone of contention is the head-injury criterion (HIC) standard which seat manufacturers say is the most difficult with which to comply. The HIC value is computed using a formula which takes account of impact, acceleration of the head and duration of the event. It is complicated by a requirement to test each seat position in relation to surrounding structures, to arrive at the complete "head-strike envelope". Manufacturers contend that it is extremely difficult, if not impossible, to meet the standard, especially where seats face a bulkhead, or where side-facing bench seats are involved. Airlines also take issue with the FAA's cost/benefit assessment which, they say, grossly overstates the benefits.

The FAA, bowing to pressure from the industry, is permitting manufacturers to equip aircraft with shoulder harnesses instead of having to comply with stringent injury standards. It also allows some flexibility in how rules are applied retroactively, from an earlier insistence that the seat-certification standards would have to be applied to FAR Part 25 aircraft undergoing major maintenance.

The FAA is not, however, waiving from its determination to ensure that air passengers receive the same safety considerations as those enjoyed by motorists, and it plans to tighten the rules further. Within five years it is expected that seats in all aircraft will have to comply with TSO C127 requirements. Also on the horizon—and strongly opposed by the General Aviation Manufacturers Association and the Regional Airlines Association—are the more stringent standards being considered by the FAA for commuter aircraft with less than 20 seats. These would require horizontal and vertical accelerations of 26G and 32G respectively, as against 14G and 16G for other aircraft.

TSO C127 requires two dynamic tests using anthropomorphic test dummies, measuring a specific maximum G and velocity change. One is performed with the seat in a 60° nose up position, the second with a 10° horizontal misalignment of the seat track. Additionally, certain stipulated limits have to be met for upper torso, pelvis, femoral and lumbar loads.