Redesigning Ejection Seats

Ergonomics is the study of problems associated with people adjusting to their environments. The environments are varied and include manufacturing assembly lines, computer stations, cars, elevators, theater seats, and aircraft cockpits. Good ergonomic design results in an environment that is safe, functional, efficient, and comfortable.

Changing times often require ergonomic changes. When visiting homes that are hundreds of years old, you may have notices that the door openings seem too low. The doorway heights that were comfortable a few hundred years ago are not so comfortable for taller people of today. The United State Air Force recently encountered an ergonomic problem created by its recognition and acceptance of the fact that women make perfectly good pilots of fighter jets. Cockpits of fighter jets were originally designed for men only, so various cockpit changes were required to better accommodate the new women pilots.

The ACES-II ejection seat is under redesign. It is currently designed for men who weigh between 140 pounds and 211 pounds. Based on data from the National Health and Examination Survey, weights of women have a distribution that is roughly bell shaped with a mean on 143 pounds and a standard deviation of 29 pounds. Any women pilots weighing less than 140 pounds and greater than 211 pounds would have a greater chance of injury if it became necessary to eject. How to redesign the seat becomes an important question when the lives of the pilots in the USAF are at stake.