Protective Equipment

Three-Dimensional Flail Zone Creation for Occupant Centric Platform Design

Occupant Centric Platform Technology Enabled Capability Demonstration tasked ARL to develop three-dimensional flail zones for head, arms, and legs, based on the two dimensional strike envelope information extracted from the Aircraft Crash Survival Design Guide (1989). The strike envelope was based on the 95th percentile Army aviator, wearing restraints. Data was gathered using a 95th percentile ATD subjected to (-Gx) acceleration of 30G in a forward motion. This data was then extrapolated to create the expected lateral motion of an occupant. ARL utilized the Large Overall Male and Small Overall Female boundary manikins to bookend the central 90 percent of the Army Service Member population. The flail zones were exported for use in a computer-aided design to drive component placement inside of the occupant workspace, support space claim for energy absorbing materials, and visually show where impact hazards may exist. Implementing these unique flail zones could significantly protect the Service Member from contact injuries caused during vehicle impact and blast events.