



Ejection Modeling and Simulation System (EMASS)

Innovision, LLC.

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EMASS is an advanced modeling and simulation environment that integrates pilot digital twins, ejection seat systems, and AI-driven analytics to predict pilot response and injury risks throughout the entire ejection process. Built on validated biomechanical and physics-based models, EMASS provides the Air Force and industry with a comprehensive, multi-phase ejection simulation platform.

Key Features & Capabilities

Integrated Multi-Phase Simulation: Models all critical ejection phases—seat-canopy separation, windblast, parachute deployment, and landing impact—using Finite Element (FE), Multi-Body Dynamics (MBD), and Computational Fluid Dynamics (CFD) methods.

Human Digital Twin (HDT) Framework: Leverages validated THUMS models (AF05, AM50, AM95) with morphing, scaling, and active muscle states to predict pilot-specific responses and injuries under various conditions.

AI-Enhanced Analysis: Employs AI agents to automate model setup, run control, and report generation. Integrates with Generative AI-based Deep Knowledge Center (De-KCIB) for human response interpretation and injury risk evaluation.

Model Integration Toolbox: Seamlessly links human, seat, harness, and helmet models within a unified environment using ANSA or LS-PrePost. Supports standardized workflows for model assembly, validation, and post-processing. Provides template models to simplify and expedite model set-up process.

Adaptive Injury Prediction: Implements data-driven algorithms to optimize ejection seat system parameters—restraint tension, helmet inertial properties, seat trajectory, and parachute timing—reducing neck and spine injury risks.

Data Warehouse & Library: Stores simulation histories, validation data (identified and processed data sets from CBDN), and pre-configured models for rapid reuse and scenario analysis.

Benefits

- Enhances pilot safety through model-based, predictive, data-driven injury analysis
- Reduces modeling time via streamlined and AI-assisted workflows
- Supports cross-platform integration with USAF digital engineering environments
- Enables dual-use transition for both military and commercial aviation

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