EFFECTIVENESS OF SUSTAINED-G SIMULATION IN LOSS OF CONTROL AND UPSET RECOVERY TRAINING

Summary
This study is part of a larger body of research aimed at understanding man-machine interaction in aviation, and its influence on aviation safety. In part one of this study a group of pilots experienced flight upset profiles in the GYROLAB GL-2000 centrifuge-based simulator and evaluated the simulator to determine if sustained motion simulation is of sufficient fidelity to improve pilot-reaction to unplanned, simulated, aircraft upsets. In part two of this study pilots were monitored with a variety of physiological sensors to determine if there are identifiable psychological and physiological responses that occur in pilots when their exposure to an unplanned upset results in a mishap.

Objectives
- To observe trends between the success of recovery attempts and the physiological and psychological response of the pilots
- To validate the GYROLAB GL-2000, as a research and training tool for replication of pilot-in-the-loop control system performance and aircraft response in upset and off-nominal flight conditions
- To identify trends in the physiological and psychological responses of pilots recovering from upset conditions in large transport aircraft

Customer/Partner
NASA (Grant NNL06AA21G)

Status
Complete (2009)
2.4 AN EXPERIMENT TO EVALUATE TRANSFER OF UPSET RECOVERY TRAINING CONDUCTED USING TWO DIFFERENT FLIGHT SIMULATION DEVICES

Summary
Air transport training programs provide simulator-based upset-recovery instruction for company pilots. However, no prior research demonstrates that such training transfers to an airplane in flight. This FAA-funded research experiment was designed to evaluate upset-recovery training transfer. Two groups of participants were given simulator-based training in upset-recovery, one in a high-end centrifuge-based device, the other using Microsoft Flight Simulator running on desktop computers. A third control group received no upset-recovery training at all. All three groups were then subjected to serious in-flight upsets in an aerobatic airplane. Pilots from both trained groups significantly outperformed control group pilots in upset-recovery maneuvering. However, performance differences between pilots from the two trained groups were less distinct. Moreover, pilot performance in both trained groups fell well short of the performance exhibited by pilots experienced in all attitude flight. Although we conducted flight testing in a general aviation airplane, our research has important implications for heavy aircraft upset-recovery trainers.

Objectives