

QUANTIFICATION OF CORIOLIS CROSS-COUPLING INTENSITY DURING CENTRIFUGATION AND SUSTAINED-G FLIGHT TRAINING

Summary

Technological advances have allowed centrifuges to become more than physiological testing and training devices; sustained-G fully interactive flight simulation is now possible. However, cross-coupled stimulation of the semicircular canals, due to head or gondola motion during centrifugation, can cause tumbling sensations that are potentially distracting, nauseogenic, and unpleasant. As new efforts are underway to mitigate or eliminate these motion artifacts, reliable, quantitative tools for measuring tumbling intensity are necessary.

Historically, tumbling intensity has been measured via non-compensatory vestibulo-ocular reflex (VOR) response (i.e. eye movement data from infrared or electrode recordings) or with a subjective intensity rating scale verbalized by the subject. Both methods are inadequate for quantitative research and development purposes. VOR data has been shown to differ from perceived response for many common perceptual paradigms, including Coriolis tumbling, and subjective intensity scales are difficult to aggregate across subject populations. New efforts have been focused on quantitative and comparable methods for measuring tumbling.

Objectives

- Design and implement 2 devices for CCC quantification
- Design an experiment to match results with traditional methods (i.e. rating scales and eye movement data)
- Compare results with perception model simulations

Customer/Partner

Internal Research

Status

Experimental design and hardware development started in January 2013

Future Publications

American Institute of Aeronautics and Astronautics (AIAA)