This page describes a data management plan written for the United States Department of Transportation (DOT) using the DMPTool.

Development, Verification, and Validation of G-LOC Model

Contributors to this project

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Project details

Research domain: Medical and Health Sciences

Project Start: October 01, 2018

Project End: March 31, 2023

Created: March 27, 2023

Modified: April 05, 2023

Ethical issues related to data that this DMP describes? no

Citation

When citing this DMP use:
Kyle Copeland. (2023). "Development, Verification, and Validation of G-LOC Model" [Data Management Plan]. DMPHub.
https://doi.org/10.48321/D1CH0J

When connecting to this DMP to related project outputs (such as datasets) use the ID:
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Funding status and sources for this project

Status: Granted

Funder: Civil Aerospace Medical Institute (faa.gov)

Grant: unspecified

Project description

The published models of G-LOC and recovery in the public domain are based on empirical fits to data from centrifuge experiments and on blood pressure. A resource-flow based model of G-LOC and recovery built using more detailed physics and physiology will be developed. This new model is implemented via software and results will be compared with existing models for predicting symptoms known to occur in aeronauts during positive and negative Gz accelerations encountered in aerobatic flight and observed in centrifuge experiments.

Planned outputs

Civil Aerospace Medical Institute G Effects Model

The Civil Aerospace Medical Institute (CAMI) G Effects Model (CGEM) software models effects of extreme Gz accelerations, including visual symptoms, G-LOC, and return to consciousness following G-LOC. The software accommodates Gz acceleration profiles experienced by most civilian and military pilots and also reproduces historical centrifuge experiments. Effects such as dehydration and fatigue are readily accommodated through changes in physiological parameters. Future planned developments include extending the model to include monitoring additional brain centers to facilitate inclusion of A-LOC symptoms, anti-G equipment failure, an improved lung function model, direct inclusion of a library of acceleration profiles for standard aerobatic maneuvers used in airshows, and a more user-friendly means of inputting effects of pilot dehydration and fatigue beyond adjusting the current input parameters.

Format: Software

Release timeline: March 31, 2023

CGEM User's Guide

Guide for users with instructions describing the software that does the calculations needed to get results from the Civil Aerospace Medical Institute (CAMI) G Effects Model (CGEM) and how to use it.

Format: Text

Release timeline: January 31, 2023

Cerebral Blood Flow Based Computer Modeling of Gz-Induced Effects

Accepted version of a paper intended for publication in the peer-review scientific literature describing the Civil Aerospace Medical Institute G-Effects Model [CGEM], possible applications, and its verification and validation by comparison to published data from experiments and earlier models. Published as report DOT/FAA/AM-23/6.

Format: Text

Release timeline: January 31, 2023

CGEM: A CEREBRAL BLOOD FLOW BASED COMPUTER MODEL OF GZ-INDUCED EFFECTS

This is a narrated slide show describing the CGEM model originally presented at the 2021 Annual Meeting of the Aerospace Medical Association in Denver, CO on 1 September 2021.

Format: Audiovisual

Release timeline: March 31, 2023

Other works associated with this research project

Articles

https://doi.org/10.21949/1524446   No citation available

Softwares

https://doi.org/10.21949/1524439 No citation available

Supplemental information

United States. Department of Transportation. Federal Aviation Administration. Office of Aviation. Civil Aerospace Medical Institute. 2021. "CGEM User's Guide." https://doi.org/10.21949/1524438.

United States. Department of Transportation. Federal Aviation Administration. Office of Aviation. Civil Aerospace Medical Institute. 2021. "CGEM: A Cerebral Blood Flow Based Computer Model of Gz-Induced Effects." https://doi.org/10.21949/1528555.