INTRODUCTION

Rigorous verification, validation, and credibility (VV&C) processes are imperative to ensure that models and simulations (M&S) are sufficiently reliable to support design and operational decision-making. The NASA standard for M&S, NASA-STD-7009, was a resultant outcome of the Columbia Accident Investigation Board to ensure M&S are developed, applied, and interpreted appropriately for making decisions that may impact crew or mission safety. The NASA-STD-7009 Guidance Document is being developed to augment the governing standard and handbook to provide information, tools, and techniques applicable to the probabilistic and deterministic biological M&S more prevalent in human health and performance (HHP) and space biomedical research and operations.

PHILOSOPHY

Inherent in this guidance is the understanding that the application of many of these human health and systems M&S is to provide insight and information to areas where such information is lacking, versus for design purposes. The key is that a) all parameters may not be known a priori, and b) the fundamental relationships between and among parameters may not be known. Thus in many cases, the M&S are truly research efforts just to generate one simulation. This lack of specificity in the M&S is not a reason for the developer or customer to reduce the rigor in assessing model credibility. Quite the opposite-the more the models are “plastic”, the more rigorous the developer must take and the customer must expect in order to adequately quantify the understanding of the model output application. By communicating a complete understanding as possible of the model’s effective abstraction of the real world human health system, including level of validation and parameter sensitivities, the model becomes credible to the decision maker and an integral part of their decision making process.

DISTINCTIVE FEATURES

Three areas of the NASA-STD-7009 Guidance Document that we consider unique from the governing standard are:
1. Credibility assessment weighting factors- different for probabilistic and deterministic models
2. Criteria for technical review- including not only the details of technical review but also who should be involved at each level
3. Personnel roles and responsibilities

REFERENCES