A MODEL-BASED ENGINEERING (MBE) MANIFESTO

PURPOSE: To motivate the transformation to Model-Based Engineering.

Faced with increasing system complexity, interdependencies, breakdown of document-based methods, and other challenges, MBE provides the transformation in which we value:

1. Information over artifacts
2. Integration over independence
3. Expressiveness with rigor over flexibility
4. Model usage over model creation

We value the items on the right, but not at the sacrifice of the items on the left.

WITH THESE PRINCIPLES:

On behalf of stakeholders, MBE increases emphasis on describing the nature and content of the information produced and consumed, compared to the traditional emphasis on engineering process and procedure.

We recognize that—-independent of specific information format, structure, language, syntax, the sequence or order of its production and consumption, and the domains and environments of our projects—the underlying nature (semantics) of the essential information we seek to discover and produce is invariant because of the very nature of engineering.

An essential and dynamically changing property of model information is its credibility to those people and processes which will consume that information. The critical nature of some intended uses of model information sets a higher bar on required investment in model verification, validation and uncertainty quantification.

Principles of human-machine interaction applied to the targeted stakeholders are vital to success. Application of advanced visualization methods and augmented intelligence capabilities can advance that success.

We seek an extended team across engineering disciplines with common and integrated understanding of the identity and nature of the model information as well as its content.

We seek effective enterprise-wide reuse of model-based information to more fully leverage past individual or local learning.

Systems engineering performed according to the above principles is required for the Engineering System itself, a complex and evolving system.

THE TEAM:

The team was assembled by invitation, intentionally drawing together different perspectives.

- Ed Carroll
  - Team Lead, Sandia National Laboratories, Engineering Process
- Nancy Hayman
  - SBU—Advanced Systems/Engineering Policy
- Sharif Tairagh
  - SBU—Systems Engineering/Management
- Dana Grisham
  - SBU—Del6 Government/Industry Methods
- Chris Schreiber
  - Sandia National Laboratories Systems Engineering/Engineering Interfaces
- Bill Schindel
  - CTA Systems Science/Systems Science
- Frank Salvatore
  - Insight Corp—Systems Engineering/Modeling
- Ellen Rich
  - US Army Research, RMD—System Dynamics
- Steve Jenkins
  - JPL—Systems Engineering
- Anne O’Neill
  - Boeing—Digital Transformation

LET’S HAVE A CONVERSATION

ON THE MBE MANIFESTO

[ESPR: LING, AUSTRIA, APRIL 2018]

- To motivate the transformation to Model-based Engineering:

  - Why do you not share these values?
  - Why can you not follow these principles?
  - Share your thoughts
  - Argue your point

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THE INTERNATIONAL FEDERATION FOR SYSTEMS RESEARCH IN CONFERENCE

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