

Using the Behavior Modeling Language to Create a Mission Model

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The Department of War (DoW) terminated its Joint Capabilities Integrated Development System (JCIDS) requirements process in 2025 and replaced it with Mission Engineering & Integration (ME&I). Conceived to start with a Warfighter described Mission and to ensure integration with current systems while taking into account constraints of law, policy, and physics, the DoW promulgated ME&I. The DoW also promulgated the Mission Engineering Guide, which is a start, but has not put into place the specific guidance and processes necessary to develop integrated, codified requirements using ME&I. Ideally, effective implantation of ME&I will produce a lifecycle digital mission model that describes mission objectives in terms of desired effects and outcomes, creates shared understanding of intent between the warfighter, the acquisition official, and the commercial providers, and ensures the resulting systems, equipment, information, interfaces, people, processes, and support structures are “fit for purpose” to enable mission success.

At the behest of the Australian Defense Force, Professor Geoff Dromey of Griffin University created the Behavior Modeling Language (BML) to connect and integrate complex system of system capabilities and accelerate project design and fielding. Defining a behavior as an action taken by an actor (organizations/people/equipment) using resources (data, information, ammunition, etc.) to create a change in state, the BML creates a digital representation of the actor, the resources, and the action as well as their interactions - i.e., their behaviors - to create the change in state, the desired effects to achieve mission objectives. BML enables the description, modeling and connecting of the behaviors, in series and/or in parallel, required to create the desired outcome or effect.

Kompozition, an Australian company, created a platform using BML by incorporating a Knowledge Graph with proprietary algorithms to build virtual, digital mission models. Kompozition asks:

1. What do you want to do?
2. How well do you want to do it?
3. What is the environment in which you operate?

Describing the required behaviors in English when answering these questions, the Komposition platform parses the words used to describe the behaviors and their constraints to create an integrated ontology using a knowledge graph where each piece of information is characterized and tagged, and in doing so, the Platform creates a model of the mission, a digital twin. The resulting model identifies areas of risk to resolution, such as incomplete or conflicting requirements, insufficient information to enable the described action, incompatibility with associated systems, etc. Again, using the collective information of the ontology stored in the knowledge graph, the Platform generates a functional requirements document and a functional architecture. Finally, this virtual, digital mission model enables a deep, accurate, and shared understanding of intent between the warfighter, the acquisition official, and the provider while de-risking and accelerating acquisition, integration, and operations.