

Modeling and Simulation Body of Knowledge (MSBOK)

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Some Views about MS Body of Knowledge

What is BOK?

As it is often the case with many concepts, there are several interpretations of BOK. From a pragmatic perspective, body of knowledge is:

- (1) "Structured knowledge that is used by members of a discipline to guide their practice or work."
- (2) "The prescribed aggregation of knowledge in a particular area an individual is expected to have mastered to be considered or certified as a practitioner."
- (3) Waite's pragmatic view is also important: "BOK is a stepping stone to unifying community" (Waite 2004).

Why there is a need for MSBOK?

Development of the Body of Knowledge for the modeling and simulation profession is an activity for which time is ripe from several perspectives:

- (1) There is enough accumulated science and technology (Zeigler 1976; Zeigler et al. 1979; Zeigler and Ören 2003; Tolk and Ören 2017).
- (2) For some time, some practitioners in related fields, such as Operations Research, not being able to realize its fundamental superiorities, considered simulation "as the method of last resort." Since a long time, the matter has been clarified (Ören 1984) and now the importance of simulation has been well established (Fishwick 1994; Mittal, Durak, and Ören (eds.) 2017).
- (3) There are over 100 associations and networking of professional groups in M&S ([Link](#)). Some of them have several conferences each year. Interservice/Industry Training, Simulation & Education Conference (I/ITSEC), for example, attracts over 20000 (twenty thousand) participants for its annual events.
- (4) There are large number of professionals active in M&S. Some of them are members of the above mentioned professional societies and for some, MS is so much interwoven in their professional lives that, similar to using mathematical techniques and not considering oneself a

mathematician, they do not consider themselves simulation professionals and mostly may not attend simulation conferences.

(5) In academia, for each MS course –undergraduate or graduate– there are several other non-simulation courses with strong MS content.

(6) Simulation is used in many important application areas (Ören 2002a).

About the Urgent Need of having an MSBOK

From the US DoD Acquisition M&S Master Plan 2006, April 17

A5.3 Action 5-3 (page 40)

Assemble and evolve the M&S body of knowledge relevant to acquisition.

A5.3.1. RATIONALE: The body of knowledge for M&S support to acquisition is deficient and not very well managed. There is no authoritative, up-to-date, consistent M&S knowledge base for defense acquisition. Bits and pieces of knowledge are found in many places, provided by many different sources. Knowledge gaps, inconsistencies, and errors are typical.

A5.3.2. DISCUSSION: An authoritative body of M&S knowledge for acquisition is needed. It needs to be established and maintained for convenient and ready use by defense acquisition programs. Consideration should be given to providing information of value via the Modeling and Simulation Resource Repository (MSRR) and a MSIAC web page. The body of knowledge must be sufficiently robust to support planning and M&S use across the acquisition life-cycle.

A5.4.1 ACTION 5-4 (a) (page 40)

Provide M&S knowledge via an expanded set of DAU courses, the DAG, and on-line Continuous Learning Modules.

A5.4.1.2. DISCUSSION: Working through existing Functional Advisors and Functional Integrated Process Teams (FIPT), education and training courses need to be expanded to include M&S body of knowledge consistent with defined requirements. In addition to DAU courses, tuition assistance for graduate degrees in M&S, other resources – such as professional military education resources – will be leveraged to deliver the M&S knowledge. Where appropriate, the defense acquisition guidebook will be updated to highlight parts of M&S knowledge and complement the courses.

A6.4.2 Action 5-4 (b) (page 41)

Provide M&S knowledge via conferences, workshops, and assist visits.

A5.4.2.1. RATIONALE: Elements of the M&S body of knowledge may change often, as does technology. Acquisition M&S processes evolve and drive the need to socialize such processes across a broad front to promote wide acceptance. To promote better understanding, interactions with industry and government audiences will encourage rich discussion and facilitate common, credible approaches. Program-specific discussions, particularly in the formative stages of the program, can also be highly beneficial.

A5.4.2.2. DISCUSSION: Active “outreach” to a variety of government and industry sponsored events is appropriate to successful delivery of the M&S body of knowledge. The outreach should include conferences, workshops, and similar forums. Also, assistance visits to acquisition programs will focus on specific application of the knowledge to support program planning and implementation.