ABSTRACT: The North Atlantic Treaty Organization (NATO) Human Factors and Medicine Panel has approved the formation of a study group, HFM-128, on human behavior representation (HBR) in constructive simulation. The differentiating focus of this working group is the translation of scientific HBR concepts into a combined “how-to” and “when-to” guide for military simulation “practitioners.” An update is provided on progress accomplished and on the final plans, meeting, and report.

1. The Genesis and Goals of HFM-128

The North Atlantic Treaty Organization (NATO) Human Factors and Medicine panel (HFM) has recognized that the vast body of human factors data and knowledge has not been fully transitioned to the military modeling and simulation community. Indeed, despite the overwhelming evidence that human behavior is at the center of military effectiveness (sometimes the action of a single individual, sometimes a team or group action), military models and simulations (M&S) generally fall short in representing human behavior. This is true for the full range of M&S—those used for system design, for training, and for mission rehearsal; those representing individuals, teams, and entire forces; and those including a representation of physical action only, and even those intending to represent complex cognitive processes such as commander decision making. The establishment of NATO HFM-128 on human behavior representation (HBR) in constructive simulation is charged with taking action to remedy this deficiency.

2. The Progress

Building on previous efforts, in particular on previous NATO efforts (e.g., Dompke et al., 2001) and over the course of a series of meetings, a generic approach to inclusion of human behavior in M&S has been outlined. The inception of this approach was documented in an earlier paper (Lotens et al., 2005), but it has matured, and been streamlined considerably. Figure 1 depicts the generic model. The notion is that this conceptual model will fit within any given M&S structure. Within a specified military mission context and within an environment represented to some level in a M&S structure, the human activities are carried out as a function of the state of the human actor(s), resulting from the
personal traits and from the stressors emerging from the activity and environment. The outcome feeds forward as behavior into the environment, and so on. (Note, there are many feedback loops that could be represented; however, Figure 1 represents the essence of the model framework.)

The target audience for the report from HFM-128 is not the human factors community or HBR modelers per se, but rather, the more general military M&S community (although HBR modelers may find value in models that lie outside their own area of expertise). Thus, the report is intended to serve as a guide to the factors to be considered, a pointer to existing models or applications, with explicit examples. In order to communicate the impact of good HBR in M&S, an operational scenario is used.

Operational scenario snippet: The year is 2015. The NATO countries are preparing for a humanitarian effort. Before arriving in-country, Colonel Schmidt and Lieutenant Anderson had trained together even though they were from different NATO countries. Their operating styles and their shared understanding about the common mission grew out of distributed team training with simulations. HBR modelers had tailored representations of teammates via modifications to HBR cultural parameters.

The key chapters outlined to date include perception, cognition, motor tasks, moderators, and errors. For each there is an emphasis on source materials that describe key considerations and on the type and level of information to be considered. Formal models or theoretical approaches are identified in each section. The scenario is used to demonstrate what level of representation of perception, cognition, or errors might be represented, and to what effect or benefit to system design, training, or the operational mission. Additionally, to emphasize both the practical and the scientific, there is explication on validation and standards, an area unanimously agreed to be in need of special emphasis.

3. The Plans

The culminating event prior to the final report will be a NATO Specialists Meeting in Toronto in May 2007. Key issues will be discussed by human factors specialists, M&S experts, and M&S stakeholders as a critical review of the concepts and approach. POC for the meeting is Mr. Cain, DRDC Toronto, Brad.Cain@drdc-rddc.gc.ca. The final report will be a ‘good practices’ document for simulation practitioners as a guide to what and how and when to apply HBR.

References


Author Biographies

Wouter Lotens is with Human Factors, TNO. A key TNO focus is human behavior and performance modeling, especially for individual warriors. Dr. Lotens is the lead for HFM-128.
Laurel Allender, at the U.S. Army Research Laboratory, is currently Co-Chair of BRIMS and conducts HBR research.
Andy Belyavin, a QinetiQ Fellow, specialising in statistics, human performance modeling, stressors and workload.
Brad Cain, at DRDC, researches human performance modeling, notably the "Simulated Operator for Networks."
Martin Castor, at the Swedish Defence Research Agency, FOI, focuses on measurement and statistical modeling.
Kevin Gluck, U.S. Air Force Research Laboratory, researches cognitive modeling for training and model validation.
Joe Armstrong is a human factors specialist doing modeling-based work for both the Canadian and U.S. armed forces.