

# HFM-143 NATO Research Specialists Meeting on Human Behavior Representation in Constructive Modeling: Report of the Recommendations

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**ABSTRACT:** As the penultimate effort of the North Atlantic Treaty Organization (NATO) Human Factors and Medicine Panel (HFM) study group, HFM-128, a Specialists Meeting was held in May 2007. This poster presents the summary recommendations of the more than 30 experts and practitioners in human behavior representation (HBR) who assembled to discuss seven challenge topics.

## 1. The Motivation of the Specialists Meeting

The NATO HFM Research Task Organization (RTO) has coordinated several studies on the modeling of personnel and platforms within military simulations (e.g., NATO RTO, 2001). HFM Research Task Group 128 on HBR in Constructive Simulation focused on providing guidance to operational analysts and engineers on human factors that can and should be included in operational models (Lotens et al., 2005). The work proceeded over three years by active involvement of the members, each bringing their expertise, experience, and organization's perspectives to bear; however, before completing their report, to enlist additional perspectives, they sponsored a Specialists Meeting, HFM-143.

## 2. The Specialists Meeting

Thirty-three people, HBR experts and practitioners from seven NATO member and Partners-for-Peace countries gathered at the Canadian Forces College in Toronto, Canada for a 2-day workshop (30-31 May 2007) to discuss, debate and exchange ideas on aspects of human modeling. Each day started with a keynote presentation on HBR's role in simulation. The first keynote presentation, by Dr. Robert Foster, U.S. OSD, DDR&E, provided a government and NATO perspective, outlining the need to go beyond the requirements of traditional combat modeling to include the broader range of military activities including humanitarian aid and nation reconstruction, focusing to a greater extent on the human aspects of effects-based operations and nonkinetic warfare. The second keynote presentation, by Mr. Mike Greenley, CAE Inc., provided an industry perspective, noting the need for best-practice approaches to human modeling that evolve naturally rather than mandated constraints and that if industry perceives a viable market, such as the broader

training of personnel, companies will participate in that evolution as partners. The following seven topic areas were then discussed in subsequent sessions:

1. What human factors does an operation involve?
2. Human task representation in modeling and simulation (M&S).
3. Behavior generation – variability and choice.
4. The concept of moderators.
5. Militarily relevant mental output measures – workload, situation awareness and other useful concepts.
6. Complexity, hierarchy, modularity, and validity in HBR architectures.
7. From individual to group behavior

### 3. The Recommendations

While it was difficult to capture the full scope of the discussion, which was far-ranging and animated, key recommendations were distilled for provision to NATO as it plans its future HBR and M&S priorities:

- (i) Foster closer ties among NATO M&S stakeholders, including military, analysts (represented on the SAS panel) and human sciences specialists (on HFM) to ensure that appropriate HBR models are used in military simulations, or if this is not practicable, then to recognize the limitations of the models being used.
- (ii) Establish a mechanism to collect and disseminate operational or training data that are suitable for developing and validating models of individual and group behavior and performance, particularly data that supports modeling for the “3-Block War” concept of operation.
- (iii) Promote the development of an open architecture or interface specification that supports interaction of operator models from a variety of sources within military synthetic environments, particularly those environments that deal with the broader issues of effects-based operations and the activities characterized as a 3-Block War.
- (iv) Promote the development and publication of formal models that support the analysis of effects-based operations, including the influences of culture, motivation, and public opinion on individuals and groups.
- (v) Promote the use of HBR modeling approaches in military M&S for which the actions of individuals and teams play a critical role in the observed behaviors and outcomes.

### References

- NATO RTO (2001). Human behavior representation. RTO Technical Report 47 AC/323(SAS-017)TP/25. U. Dompke, Chairman. North Atlantic Treaty Organization Research and Technology Organization BP 25, 7 Rue Ancelle, F-92201 Neuilly-sur-Seine Cedex. FR.
- Lotens, W., et al. (2005). HFM-128 NATO Research Task Group on Representation of Human Behavior in Constructive Simulation. Proceedings of the Behavioral Representation in Modeling and Simulation Conference. Paper #05-BRIMS-064. Universal City, CA.

### 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 a past BRIMS Co-Chair and conducts HBR research.

**Andy Belyavin**, is a QinetiQ Fellow, specialising in statistics, human performance modeling, stressors and workload.

**Brad Cain**, at DRDC, hosted HFM143 and 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.

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