

Chapter 2 – OPENING ADDRESS

Dr. Wouter Lotens

TNO Human Factors
Kampweg 5, PO Box 23
3769 ZG Soesterberg
THE NETHERLANDS

This Specialists' Meeting is the result of discussions that were held over three years in the HFM-128 task group on HBR in constructive simulation. The similarity in the names is not coincidental. HFM-128 was tasked to find ways to implement human factors in operational modelling to address deficiencies in the more typical, mechanistic approach to modelling the activities of personnel or platforms controlled by personnel. The ideas emerging from that work will be documented in a report later this year. However, facing the moment that we have to formulate recommendations to NATO, HFM-128 considered that it would be prudent to consult the community on some of the issues being reviewed. Far more was addressed than we can discuss here, but we prepared seven items that may receive ample interest and are at the core of behaviour generation in models. The target audience for this Specialists' Meeting includes human factors specialists, developers of modelling systems and potential users. It was observed that there are few forums for these stakeholders to meet collectively and that having them together would be of benefit to all parties.

HFM-128 concluded that several deficiencies in human behaviour modelling still exist. Previous reports, such as from SAS-017 (RTO, 2001) and the two authoritative books by Pew and Mavor (1998) and Gluck and Pew (2005), identified a number of outstanding questions including:

- How can a balanced human factors input be given to operational modelling involving the relevant human factors with the appropriate accuracy?
- How can a range of likely behaviours be generated in a given situation and how is the selection made for the single behaviour that is activated?
- How do we obtain models that are fit for purpose, rather than selecting the nearest available model?
- What performance metrics can be applied in the military context of the simulated problem?
- Can we limit the effort of a study by reuse of sub-models and reduction of complexity?

HFM-128 developed a vision on these challenges based on scientific insights and operational developments that will be reported in its final report. Typically, in many applied models and architectures, scientific knowledge is neglected in the favour of convenient engineering techniques that are assumed to deliver valid results. In many instances this approach is no more than an engineering representation that fills a similar role to the human functions without consideration of the capabilities and limitations of the personnel they are attempting to characterize. The military modelling and analysis community need solid science-based representations of these human functions to have confidence in the validity of the resulting performance.

Studies need to be carefully framed to provide the context and military perspective required to produce useful results. Certainly, the advent of effects based operations has a profound impact on what behaviours are demonstrated, the performance that is realized and the metrics that should be applied to assess the outcomes. Classical measures such as time to completion and casualty counts may be subordinate to operational success or failure.

OPENING ADDRESS

One way to reduce modelling complexity is through a moderator concept that allows analysts to separate human functions from states and traits yet still incorporate individual differences to affect performance on subtasks. These moderators affect task performance differentially, depending on the nature of the task and the moderator. The appropriateness of the moderator concept in human operator model is under debate but it has been successfully applied in some instances.

Cognition has a profound effect on behaviour and, in particular, decision making. Behaviour representation generally implies that a number of response options are available for given situations and that choices are not scripted, resulting in a different course of action. The control of the decision making and the cognitive process involved in decision making are key to generating plausible, validated behaviour and performance. Few if any of the in-service M&S tools consider aspects such as expertise and Naturalistic Decision Making, resorting instead to more mechanistic, Artificial Intelligence approaches.

This is a potentially powerful vision on a difficult subject and there are no ready answers. The discussions in this Specialists' Meeting have to reveal if the community agrees and NATO can be recommended to follow this route.