

# **A Reference Model to Facilitate Collaboration in Human Behaviour Representation for Security and Defence Simulation Modelling**

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# HBR in Defense M&S: Challenges

- Human behaviour representation (HBR) in defense modelling & simulation is approached by wide range of disciplines  
(e.g. computer science, sociology and psychology)
- Differences between disciplines in approach, use of language, knowledge systems, perspective, makes representation of human behaviour inconsistent and collaboration difficult
- Increasingly complex operating environments require more nuanced representations of human behaviour
- Non-kinetic effects on human behaviour are often overlooked
- Single-use modeling: each sim model typically designed for a specific situation and application

# Types and Dimensions of HBR Models

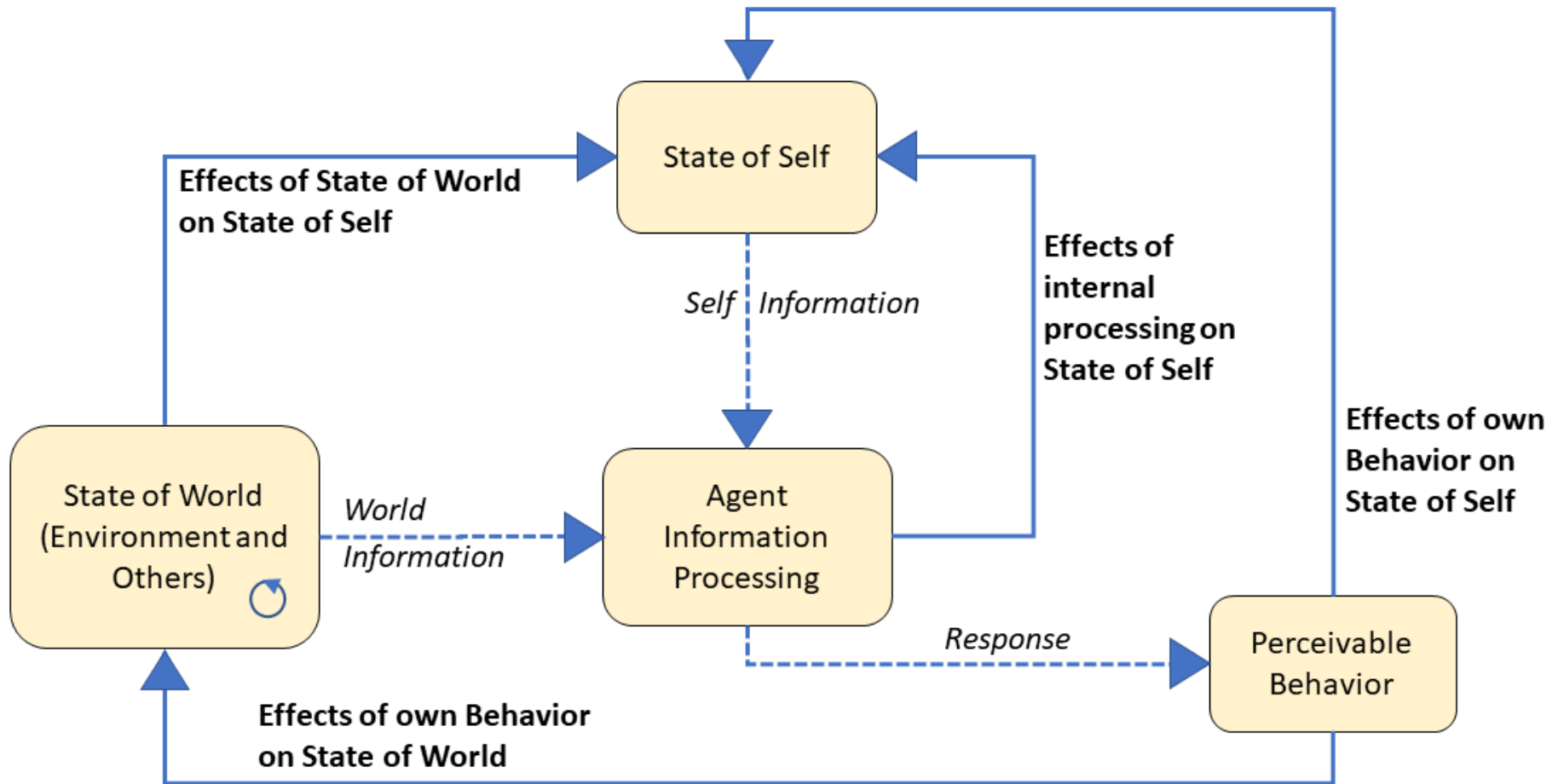
- Training and Analytical
- Aggregation of individuals
- Human and non-human agents
- Kinetic and non-kinetic effects
- Combat models and non-combat models
- Level of complexity (structural, logical)
- Conceptual model vs. coded simulation model

# Definitions

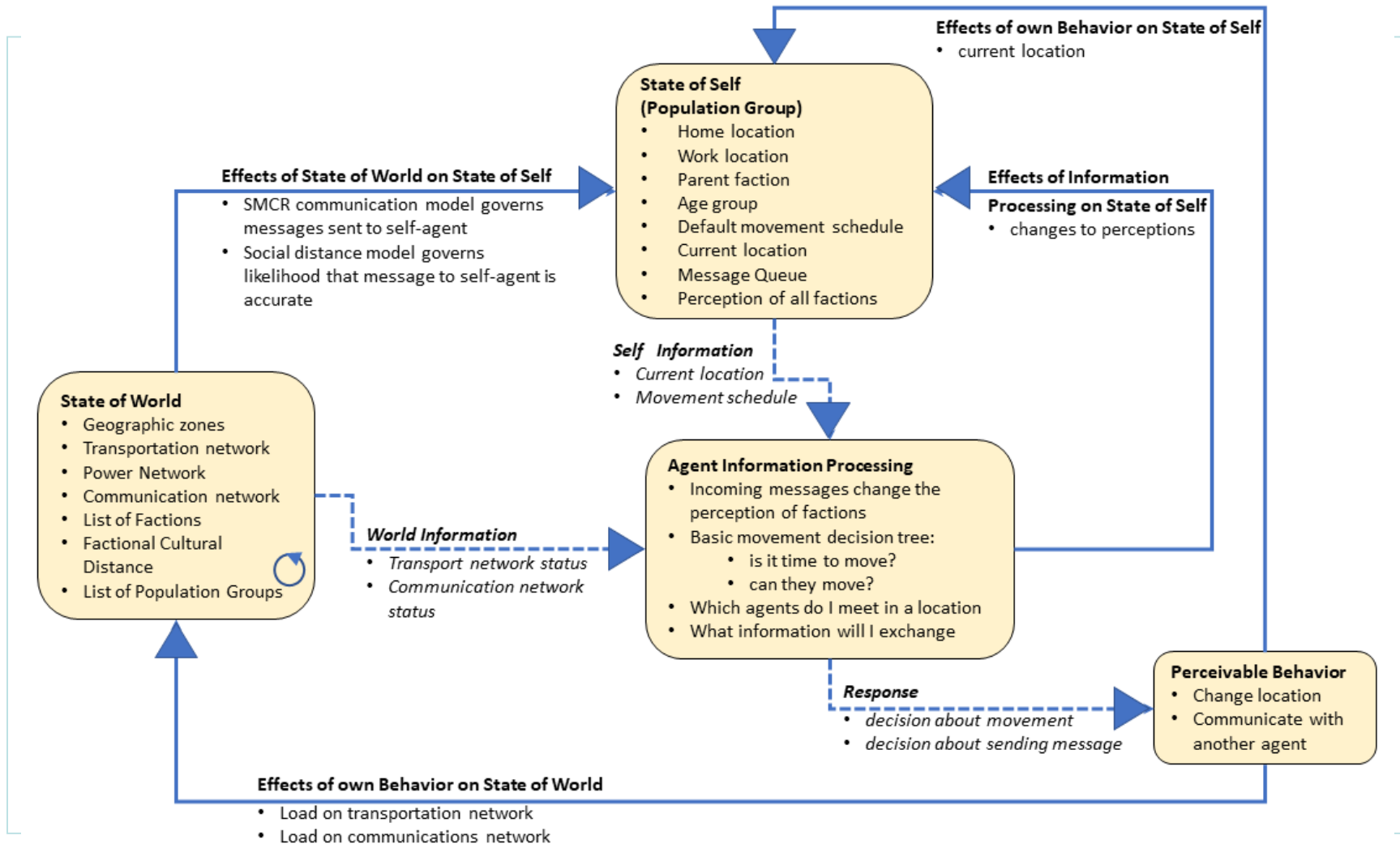
***Behaviour: the perceivable response of an entity with agency to various stimuli in the context of constructive simulation***

- Entity
  - any specific 'thing' that is defined and given attributes in the simulation model
  - can be used to describe animate or inanimate objects at any level of aggregation
- Agency
  - characteristic that provides the entity with a means of exerting power and having an effect in any given environment.
- Agent
  - an entity that has agency
  - makes decisions based on interactions with others and the environment within the simulation.

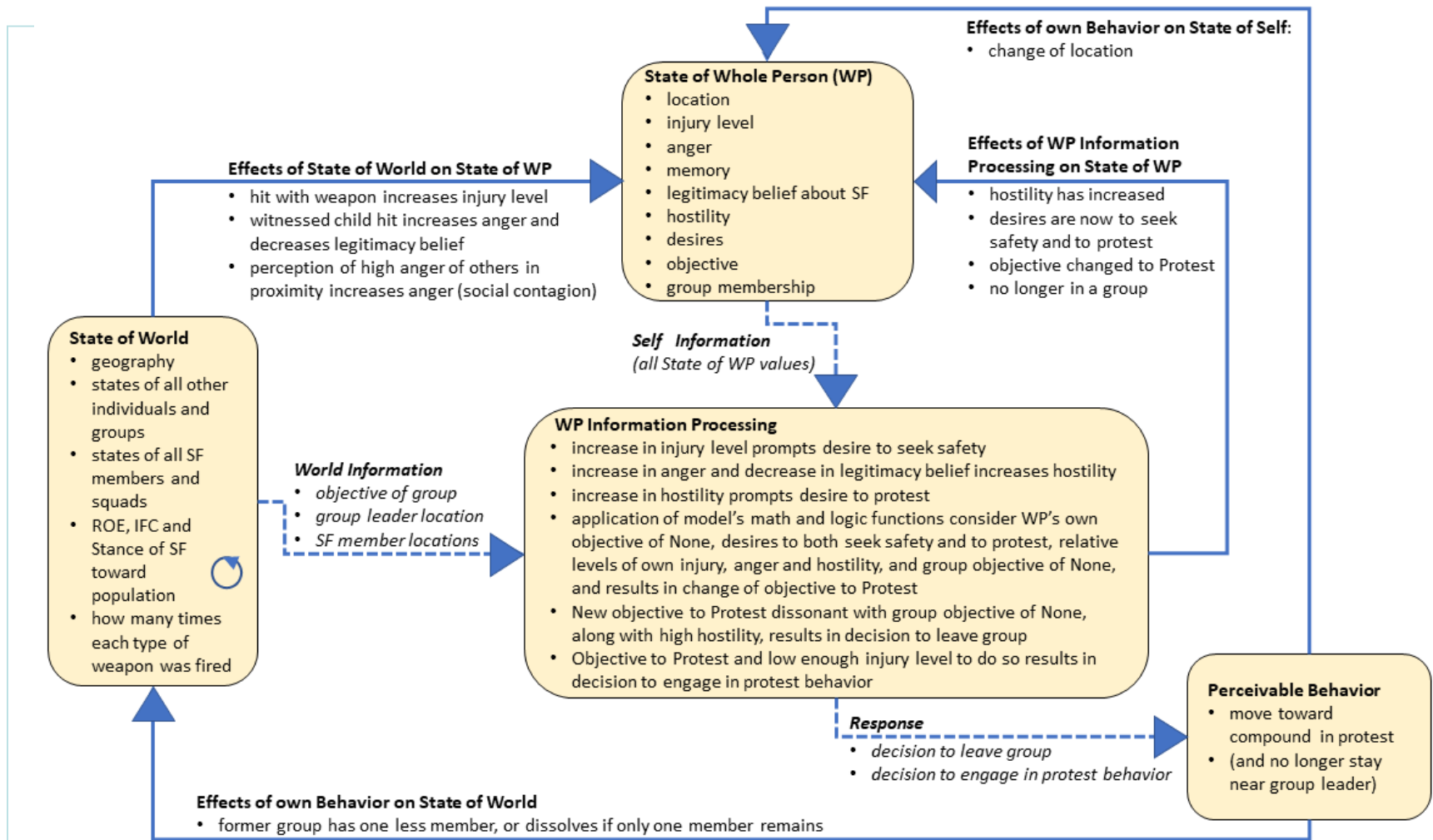
# Agent Behaviour Reference Model



# Example: IICM



# Example: WRENCH



# Summary

- Presented and clarified ABRM from MSG-198
- Demonstrated application of ABRM with examples from two different simulation models
- Highlighted benefits and limitations of ABRM

This work provides foundation for MSG-222 “Representing Human Behavior and Decision-making in Modelling and Simulation” (*starting November 2023*)



