



Stop Chasing the Perfect Requirement Specification

Formalizing Conceptual Model Documentation in Simulation Acquisition

Matthew M. Morse, Ph.D.
LtCol, USMC
NPS, MOVES / DC CD&I

Susan Aros, Ph.D.
NPS

Charles Rowan, Ph.D.
LTC, USA
NPS, MOVES

Simulation requirement specification is notoriously difficult, needing to capture:

- nature of the intended use for the simulation
- user interface elements for simulation environment participants/trainees, managers, and designers
- entity classes, behaviors, and entity interactions
- levels of visual and functional fidelity
- data/performance collection capabilities
- levels of abstraction/simplification across the board

The Over-Specification Paradox

Too much detail limits acquisition professionals' maneuver space

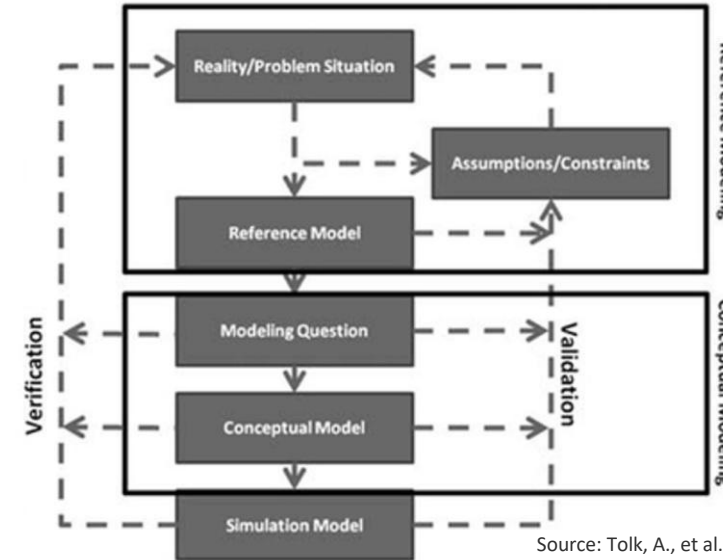
Too little detail increases risk of requirements/intended use misinterpretation

Well Known Solution: SCM Documentation

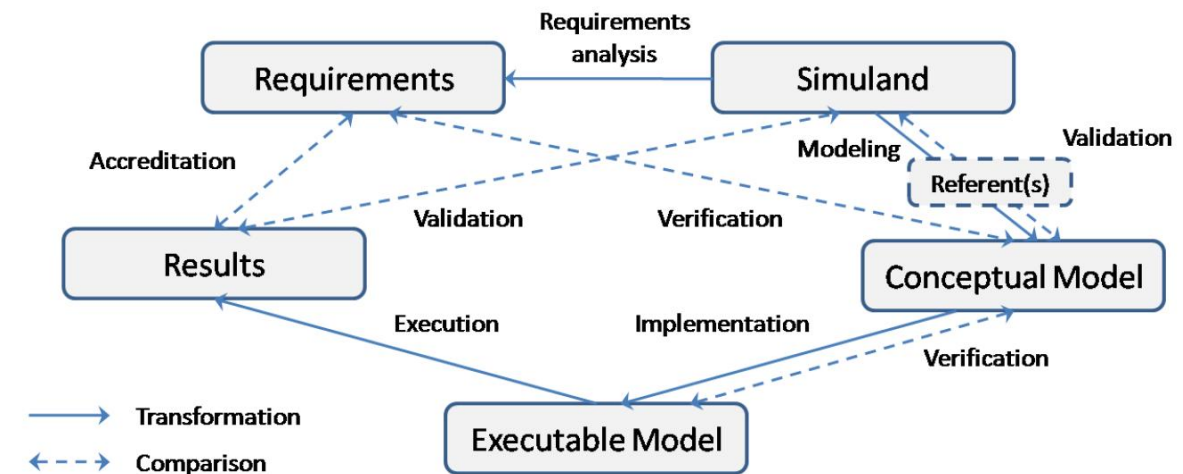


Simulation conceptual models

- serve as the blueprints for simulations
- identify what the simulation does/doesn't simulate
- explain the nature of abstractions
- facilitate communication across all stakeholders
- are human-readable
- are implementation independent
- are a prerequisite for VV&A



Source: Tolk, A., et al. (2013). Reference modelling in support of M&S—Foundations and applications. *Journal of Simulation*, 7(2), 69–82.



Source: Appleget, J., et al. (2011). Irregular warfare model validation best practices guide. TRADOC Analysis Center (from Petty, 2009).

Why the Lack of DoW SCM Documentation?



SCM documentation is rare across DoW simulations

- Despite broad consensus regarding its value as a tool for facilitating communication between stakeholders

A potential factor:

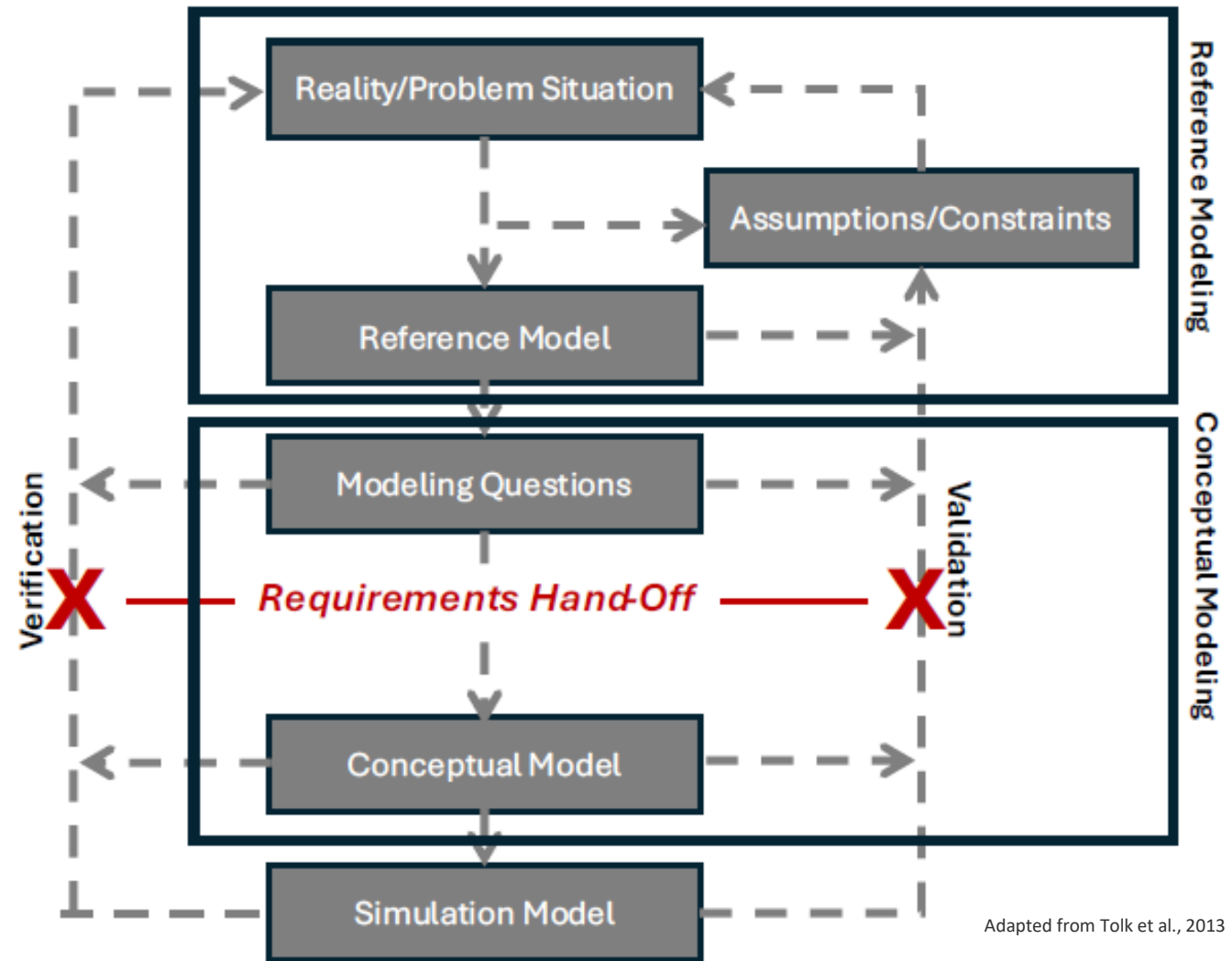
- The timing of requirements transition between the requirements manager and acquisition partners

An important consequence:

- Requirements managers attempt to write requirement documents that can't be misinterpreted

Our recommendation:

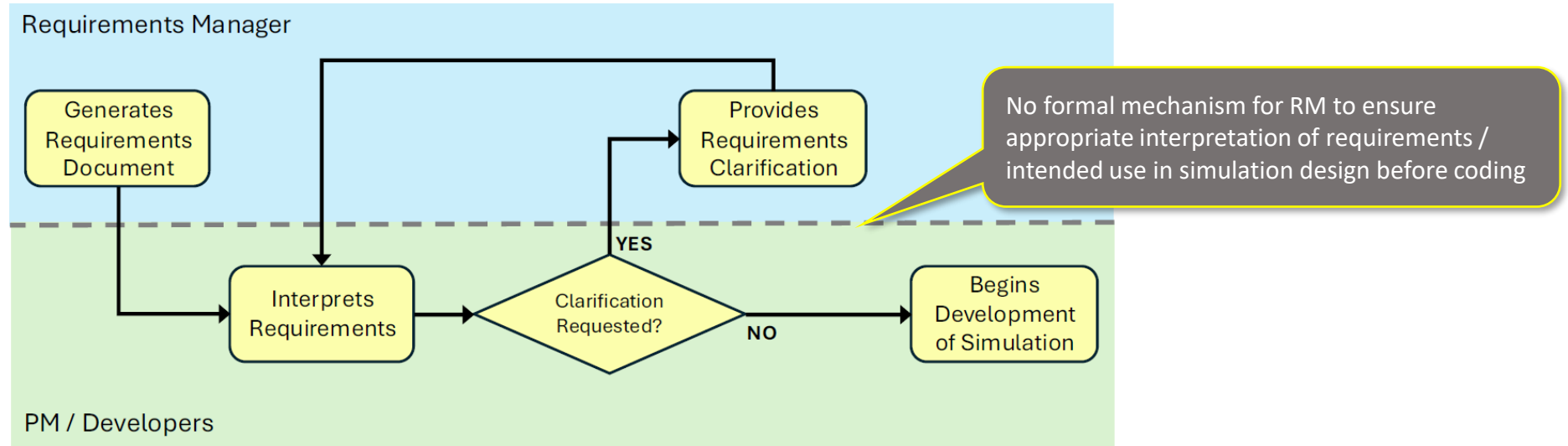
- Focus on fixing the process, not the requirements documents



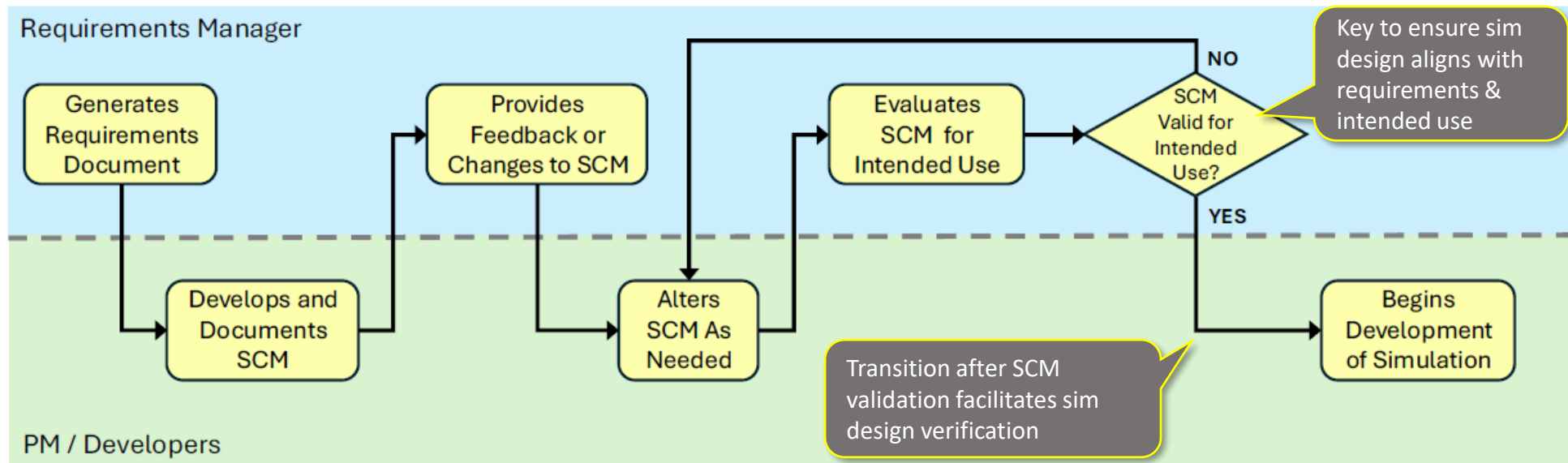
Sim Requirements/SCMD Transition Process



Conventional Requirements Generation & Transition Process



Proposed Requirements & SCMD Development and Transition Process



Formalizing SCM Documentation

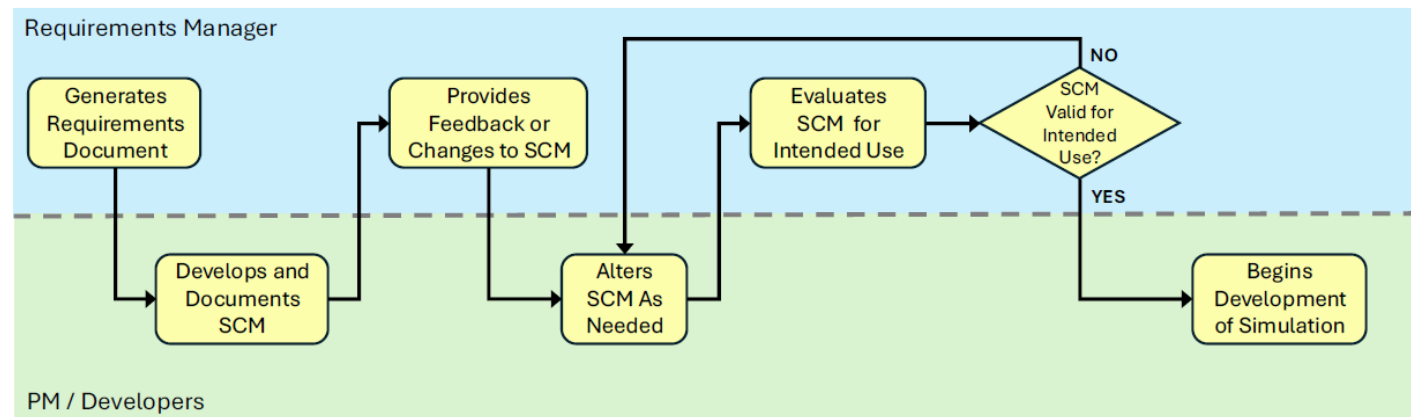


The proposed process

- ensures all parties have a shared understanding of sim capabilities/limitations & design before development
- makes overly prescriptive requirements documents unnecessary
- facilitates structured approach to VV&A
 - formalizing SCM development and validation at the appropriate time
- prevents delivery of “black box” simulations

Beyond sim design & development, it

- informs selection/reuse of sims for different uses
- facilitates structured maintenance & modernization
- enables informed sim interoperability



Obstacles to SCMD Development



Changing the process removes some obstacles. Others will remain...

Confusion over SCM definitions and methodologies

Proprietary information concerns

Perception as a bureaucratic check

The JCIDS-JFRP Opportunity



The DoW shift from JCIDS to the Joint Force Requirements Process emphasizes mission engineering/design artifacts

The services have an opportunity to rethink how we conduct requirements generation and transition for simulations

Will we follow the JFRP example, and redesign service acquisition processes to align with simulation design, development, and management best practices?

Will we stick with bureaucracy we know?

The DoD has spent decades discussing shortfalls in simulation design, development, and management

This has included admiring the SCM documentation problem

Making progress requires fixing the process

Contact Info: matthew.morse@nps.edu