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Efficiently Using Families of Diverse Models to Better Inform Decision Makers in Objective and Repeatable Ways

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Monterey, California: Naval Postgraduate School

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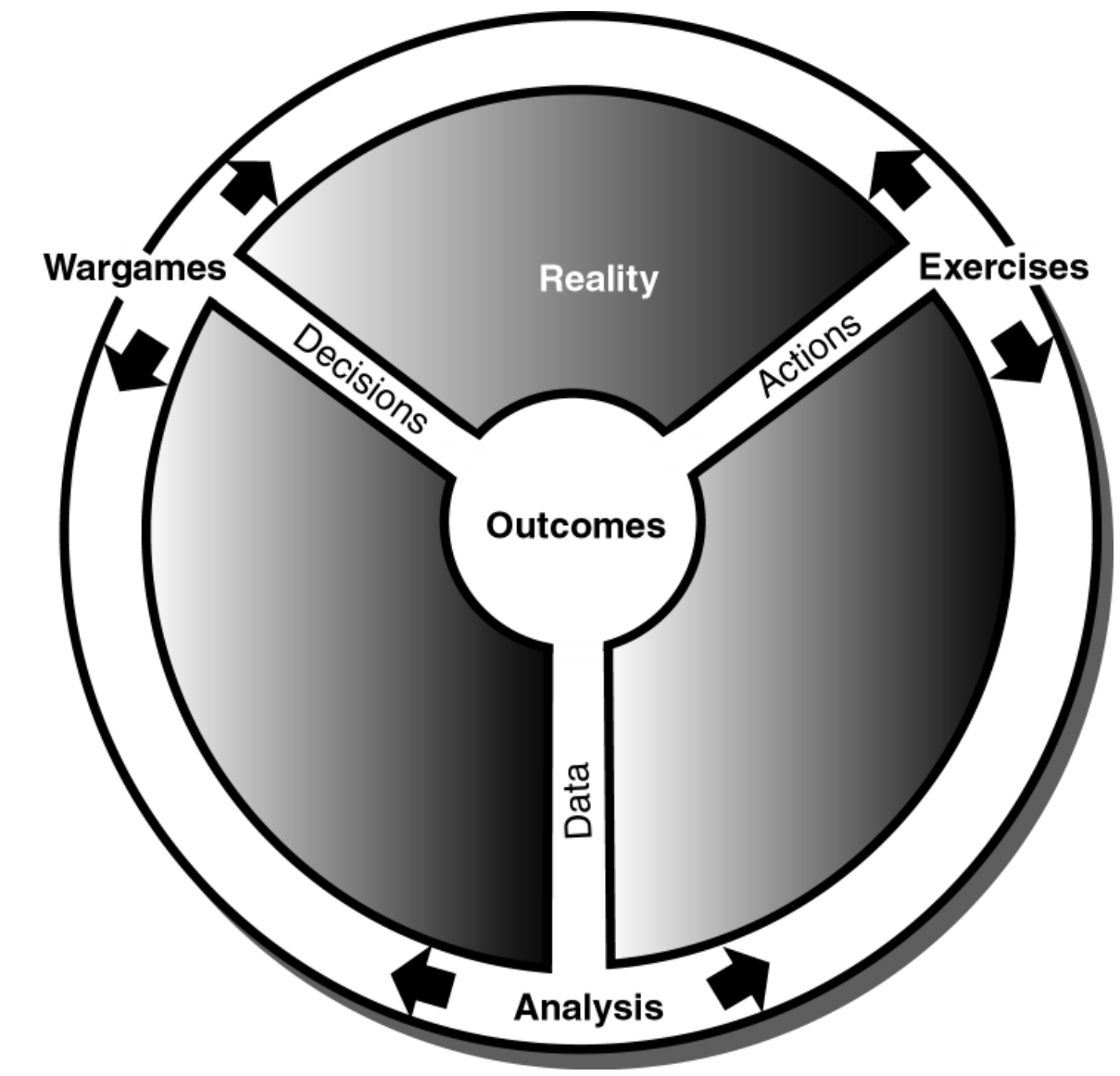
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Project Summary

- The United States Marine Corps seeks to develop a methodology for implementing a wargame-analytic continuum by formally linking outcomes of wargames with more traditional constructive closed-form simulations.
- The primary research objective was to explore methods and tools that provide the greatest utility when integrating wargames with constructive simulations.
- Assisted three thesis students with development of a constructive simulation scenario baselined to a selected topic of interest. Designed, executed, and analyzed experiments based on these.
- Used the simulation-based data and insights to inform wargaming activity.
- Conducted a broad literature review and produced a synthesis of findings and recommendations for future work.



Cycle of Research, from The Art of Wargaming, Peter Perla (1990)

Constructive Model Development

Three constructive simulation scenarios were constructed. These were used as the basis for broad exploration via design of experiments. The focus of each constructive simulation build was:

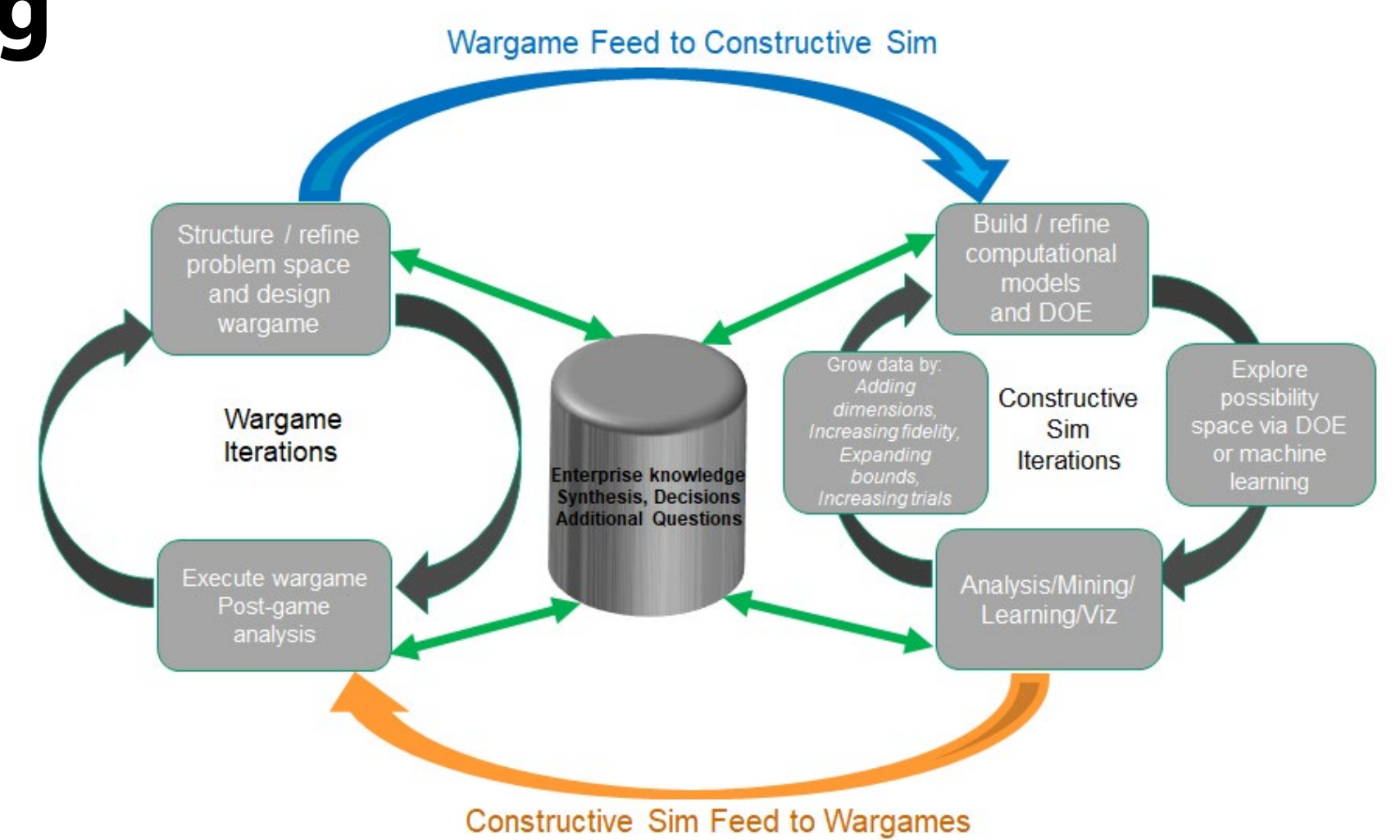
1. Anti-surface warfare battery lethality and survivability in expeditionary advanced base operations (EABO), developed with the Modeling & Simulation Toolbox (MAST).
2. Marine infantry company lethality in a Force Design 2030 construct, developed with the Map Aware Non-uniform Automata (MANA) simulation.
3. Cannon artillery lethality and survivability in a Russia counterbattery scenario, developed with MANA.



Screenshots of Constructive Simulations

Linking Constructive Simulation to Wargaming

- Each simulation-based study was used to inform a sponsored wargame, under the auspices of the Operations Analysis Wargaming Applications course.
- Constructive simulation builds and analysis informed wargames quantitatively (performance data) and qualitatively (playbook options and adjudication rules).
- A literature review was conducted and insights gained were synthesized with the students' practical applications.
- Developed a set of best practices and potential pitfalls. Key concepts were presented graphically through "loop of loops" and "sequence of iterations" diagrams.



Blue: wargame to constructive sim
Orange: constructive sim to wargame

Loop of Loops Diagram

Recommendations for Future Work

- Gain familiarity with Command PE (in use by the Marine Corps Warfighting Lab) and the Standard Wargaming Integration Facilitation Tool (SWIFT).
- Investigate the extent to which Command PE or SWIFT might be used as the basis for Post Wargame Experimentation and Analysis.
- In consultation with OAD and MCWL, select a particular topic under study by both, choose a simulation and further develop the constructive simulation to wargame (or vice versa) link, given specifics of the problem/environment chosen.
- As an extension of the holistic learning process, incorporate a link(s) to other methods, including exercises, historical data, and possibly theory.



Command PE and SWIFT



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