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Computational Experimentation to Simplify and Optimize a Large-Scale Simulation of Resourcing Marine Corps Readiness

Lucas, Thomas W.

Monterey, California: Naval Postgraduate School

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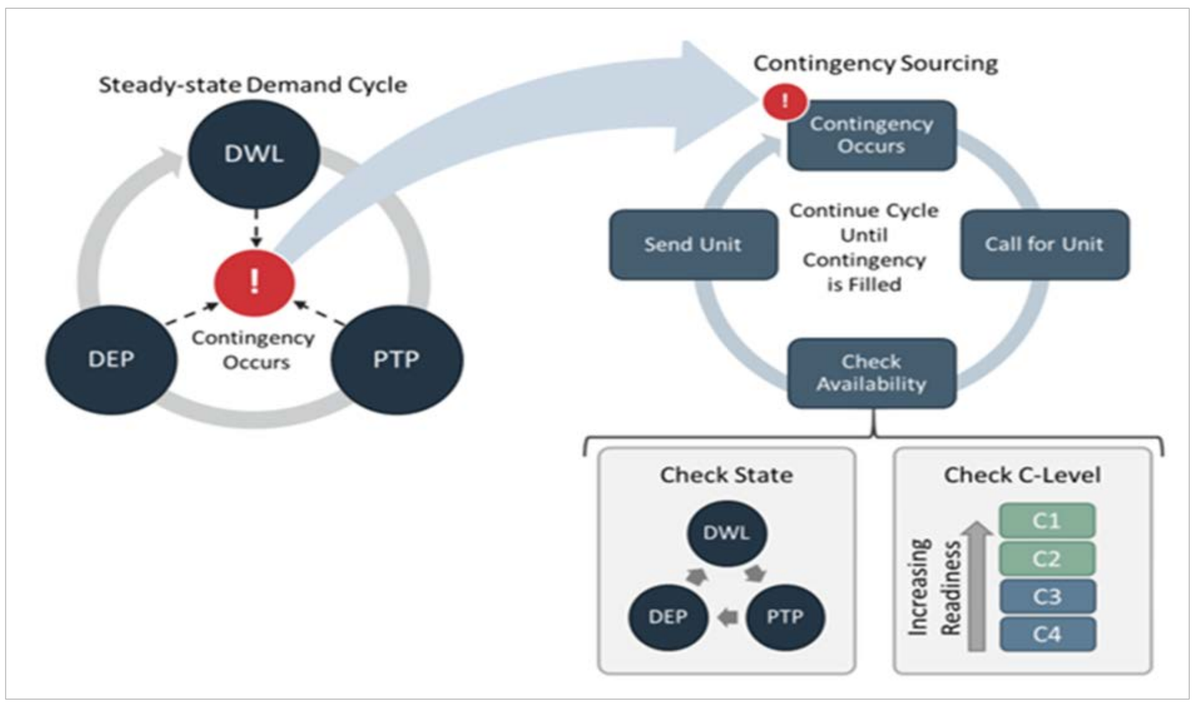
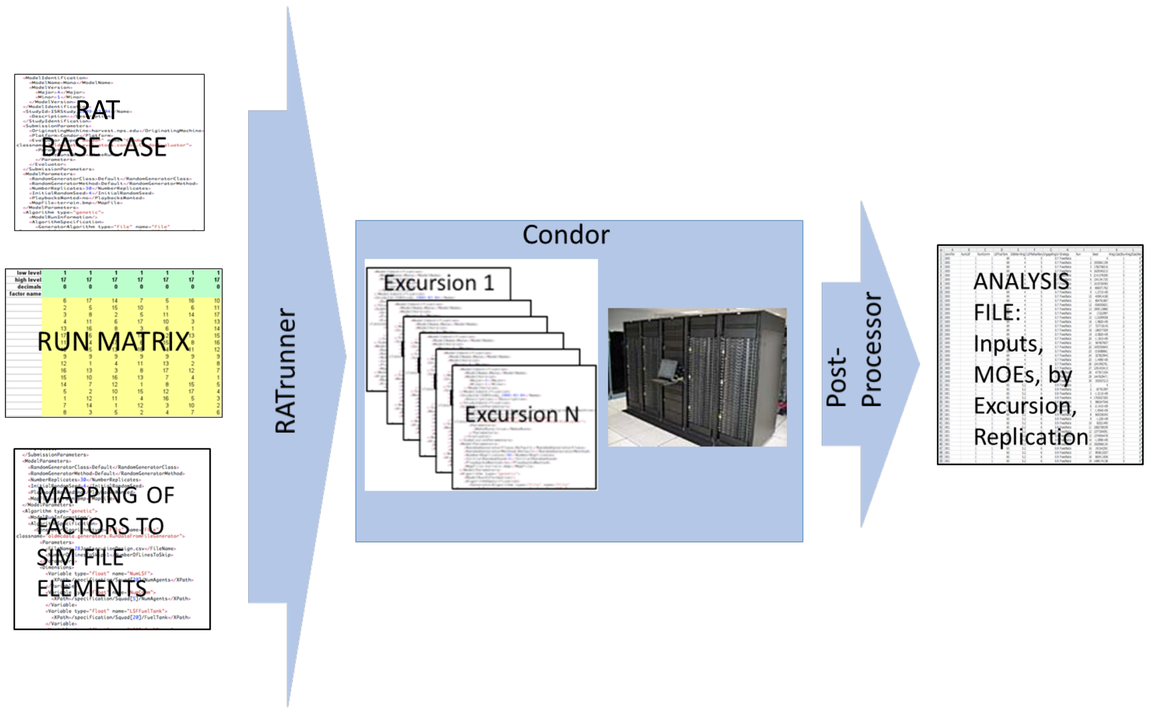
Background

- **Motivation**
  - "The Marine Corps does not yet have a measurable readiness goal with an analytical basis, or a specific strategy to meet its current overall readiness goal." -- GAO, 2016
- **Research Objectives**
  - Improve the ability to quantify Marine Corps' Readiness by enhancing the analytical power of the Readiness and Availability Tool (RAT) by enabling the use of large-scale experimentation.
  - Provide insight to into how force structure and force employment decisions impact Marine Corps readiness targets over time.



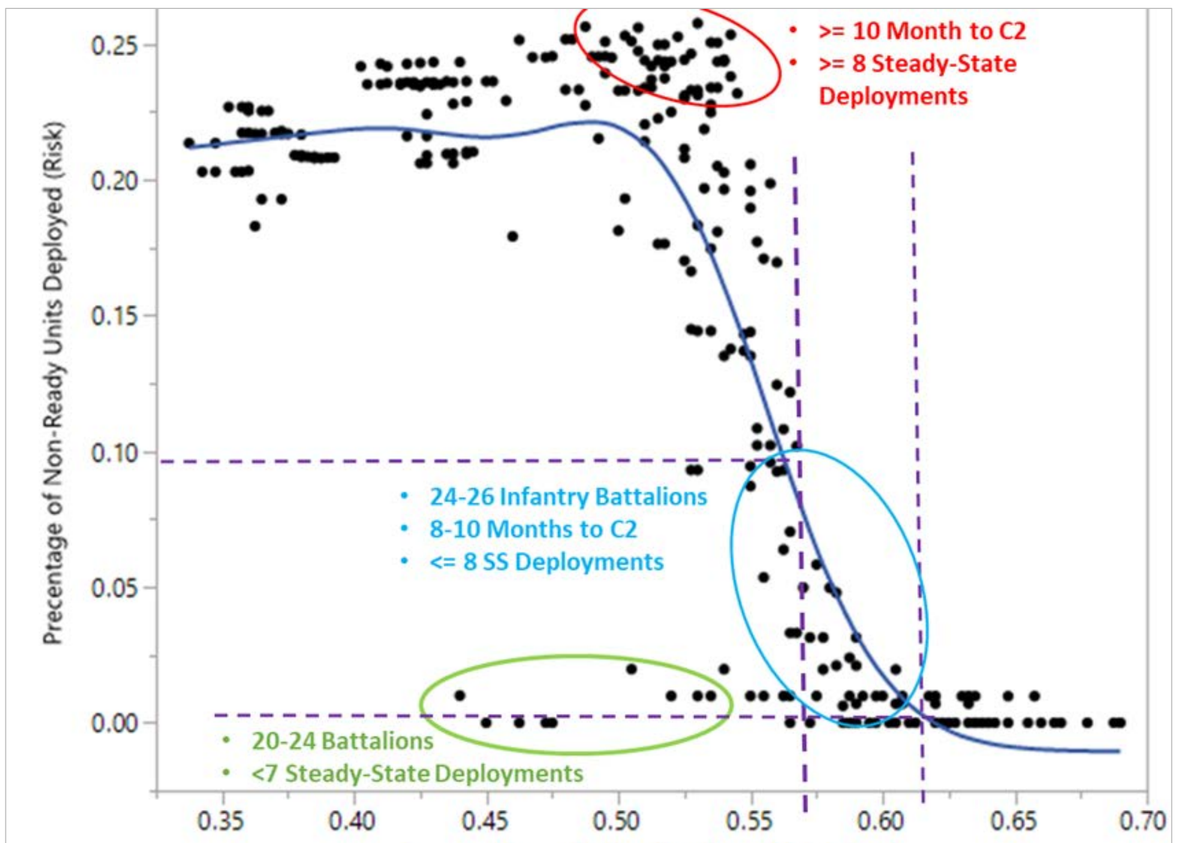
Readiness and Availability Tool (RAT) Conceptual Model



Readiness and Availability Tool (RAT) data farming process

New Data Farming Capability

- Custom software developed at NPS automates the process of running RAT
- RAT users can now use a structured approach to explore budget and readiness trade-offs.
- Over 1200 readiness scenarios were run in RAT.
- Statistical and graphical analysis of the big data generated by RATfarmer yields new insights.



Statistical Analysis of Risk versus Home Station Readiness

Findings and Recommendations

- This research developed a DOE-enabled update of RAT and used this new capability to efficiently explore the operational readiness impacts resultant from Marine Corps decisions regarding force structure and force employment.
- The number of infantry battalions is the dominant factor in determining average home-station readiness.
- The primary threshold to consider is whether the utilization is less than or greater than 23 battalions.
- A potential error exists within RAT's business rules for sourcing contingency operations, which has been identified to the sponsor.
- The Marines can leverage several findings from this research toward improving their ability to estimate operational readiness in the future. These include making more of their modeling tools stochastic and data farmable.

Researchers: Professor Thomas Lucas, Professor Susan Sanchez, Ms. Mary McDonald, Mr. Steve Upton, Major Kevin Doherty
Graduate School of Operational and Information Sciences
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