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# TECHNICAL R E P O R T

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## The RAND SLAM Program

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Prepared for the Office of the Secretary of Defense

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## Summary

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This report describes the RAND SLAM program. The RAND SLAM program allows an analyst to explore the trade-offs inherent in military force structure decisions. More specifically, the program allows an analyst to examine trade-offs between cost, stress, and risk when the requirement for deployed forces varies over time. The RAND SLAM program's unique features allow an analyst to study the effects of varying military requirements on force structure decisions. Optimal force structures can vary dramatically depending on the nature of the threat. For this reason, the RAND SLAM program models contingencies stochastically, acknowledging that military requirements vary unpredictably over time and allowing an analyst to study the implications.

This report contains a number of illustrative analyses focusing on the force structure of the U.S. Army. Many of the analyses that have been performed in support of force structure decisions have been very narrowly focused (Center for Army Analysis, 1999, 2001, 2002, 2003). The power of the RAND SLAM program is that it allows an analyst to perform many different types of analysis under almost any set of assumptions. The program's primary focus is allowing an analyst to determine the lowest-cost force structure for a given requirement and stress level (e.g., the "optimal" active-reserve mix). However, the program can also perform many other types of analyses, such as determining the effect of different requirements on stress levels for a given force structure. The RAND SLAM program was designed to provide as much flexibility as possible. The user determines both the unit of analysis and the time resolution for each set of simulation runs. The program is capable of utilizing any unit of analysis—individual, company, battalion, brigade, etc.—and modeling any time resolution—days, months, quarters, years, etc. The RAND SLAM program also allows the user to move beyond the typical analysis of finding the optimal active-reserve mix: The user can create new types of forces and examine their attractiveness under varying assumptions.

This report begins with a description of how to use the RAND SLAM program and then presents results that demonstrate the uniqueness of the program. The report is organized by chapter as follows:

- Chapters One and Two provide a description of the RAND SLAM program and how to use it.
- Chapters Three and Four examine a problem—supplying stabilization forces for Iraq as of late 2004—that has already been thoroughly examined using intensive spreadsheet techniques in *Stretched Thin: Army Forces for Sustained Operations* (Davis et al., 2005). To validate the model, the results from the RAND SLAM program are compared with those found in *Stretched Thin*.

- Chapter Five shows how to use the RAND SLAM program to perform a cost-effectiveness analysis of active versus reserve forces. In this chapter, we find that when the demand for deployed forces is constant, the relative cost-effectiveness of active versus reserve forces is very sensitive to restrictions on the use of each force.
- Chapter Six demonstrates the unique features of the SLAM program by simulating stochastic force requirements. This chapter examines the implications of a stochastic environment for force structure decisions. In this chapter, we find that, when the demand for deployed forces is no longer constant at a level at which both active and reserve forces are needed in every period, reserve forces are relatively more attractive. This chapter also demonstrates that, when planning for two simultaneous wars, active forces are relatively more attractive. The results derived in this chapter are very sensitive to the assumptions made about force costs and usage restrictions. These results are based on a primitive cost model and are only meant to illustrate the power of the RAND SLAM program.
- Chapter Seven illustrates the problem that motivated the development of the RAND SLAM program—choosing the appropriate mix of active and reserve forces. This chapter shows that the optimal active-reserve mix is very sensitive to assumptions about force costs and usage restrictions. It also shows that the optimal force mix can vary dramatically depending on the nature of the threat.

The appendixes of this document provide a more detailed description of the RAND SLAM program and how to use it. Appendix A provides a reference for users of the RAND SLAM program. Appendixes B and C provide technical details about the design of the program. Appendix D describes the process used to determine force assignment rules. Appendix E provides a detailed list of the components of the RAND SLAM program.