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Analyzing Command Posts Using Hierarchical Value Modeling

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The views expressed herein are those of the author and do not reflect the position of the United States Military Academy, the Department of the Army, or the Department of Defense.

Authors Notes: Our team consists of three senior cadets and one faculty member from the United States Military Academy at West Point. Cadets Domingo Hilario and Scott Rapuano have branched infantry while Cadet Colton Cupp branched field artillery. Mr. Scott Hunter teaches as a visiting instructor in the Department of Systems Engineering; and is the Chief of the Test Design and Analysis Branch at US Army Dugway Proving Ground, Utah.

Abstract: Military command posts (CPs) that predate the Iraq and Afghanistan conflicts were much smaller and more agile than today's CPs. Technological advances and sustained combat are key reasons for having larger, more permanent CPs. For example, more computing means a need for increased power and environmental conditioning units to keep equipment at proper temperatures. Staffs began to grow, further complicating the issue. Army strategists recognize weaknesses of having large, fixed, and complex systems; and desire CPs to be more agile, mobile, scalable, and intuitive. This research uses multi-objective decision analysis theory to evaluate many CP subsystems as well as different whole-system CP configurations. We built a hierarchical value model to compare subsystem and whole-system alternatives accounting for mission needs and commanders' preferences. This model automatically creates sensitivity analyses and Pareto charts, further aiding decision makers. The hierarchical value model provides a relatively simple evaluation method to a complex system-of-systems problem.

Keywords: Value Modeling, Decision Analysis, Hierarchical Value Model