

DYNAMIC MODELLING TO AID MANAGEMENT OF MILITARY CAPABILITY

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Abstract. Managing military capability is a complex and challenging task. Circumstances can change rapidly and forces must be prepared. Insuring excessively against short-term threats by raising levels of preparedness has the effect of stifling long-term force structure development: preparedness and force structure development activities compete for the same limited funding. Preparedness work-up activities and weapon systems acquisitions can have incommensurable lead times. This exacerbates the task of delivering military capability in the form of prepared forces with effective weapons systems, at the precise point in time they are needed. This article suggests how system dynamics modelling can help military capability managers better understand the complex dynamics they confront and the consequences of managerial actions taken in this environment, short-term and long-term, intended and unintended, so that they may make informed decisions and choose most cost-effective military capability management strategies.

“The challenge for achieving optimum military capability for a given budget, is striking the right balance between preparedness (consumption) and force structure (investment), over many years. However, getting the balance right is tricky because of the dynamic tension between preparedness and force structure [and the various elements of each]... if we buy more of one ingredient, we get less of the other [1].”

INTRODUCTION

While how we might measure preparedness and force structure (and thence military capability overall) is surely a major challenge, how we might know when we have achieved ‘optimum’ military capability would be exceedingly difficult indeed. Managing military capability must start with Government guidance; followed by establishment of objective measures of each of the key elements of capability, preparedness and force structure; and then using these to gauge performance against the overall objectives. These tasks are the remit of the Senior Executive, who must be informed by an understanding of how changes in military capability can occur over time and what are the real, underlying drivers or inhibitors of change in levels of capability. In the preparedness context, for example, it is one thing to set defined, measurable, levels of operational capability that Force Elements (FEs) or Force Element Groups (FEGs) are to maintain; it is quite another to appreciate the resource implications of changing the level of readiness. The Senior Executive needs to know ...

What factors affect cost of achieving extant levels of preparedness? What factors affect cost of achieving future desired levels of preparedness? What are the elements of cost involved in having a Brigade group prepared 28 days from today’s date to undertake an amphibious lodgement 500 km from its home base? What is involved in raising this force from its present level of readiness to a fully operational level in, say, three months? What factors might preclude achieving a specified level of preparedness [2]? If readiness levels are raised and remain high for a protracted period, what are the likely effects on funding for force structure development?

That preparedness and force structure development are strongly coupled, indeed inextricably linked, should be intuitively obvious. As noted above, if we demand high levels of preparedness, there will be less to spend on developing force structure, such as acquiring modern

weapons platforms and forming new FEs or FEGs to use them. Less obvious are the cross-impacts between schedules in acquisition programs and the need for refit or refurbishment of materiel, a need that might be produced by higher than anticipated levels of activity on operations. In such cases, making adjustments in the management of military capability can be tricky. Making major changes in any area takes time. Lead-times associated with obtaining funding for major capital acquisitions, or recruiting and training personnel are typically years, rarely months. Those lead-times can be incommensurable.

Decisions taken now can, and will, impact future military capability management for many years to come, but decisions and choices must be made. It would be a great advantage for decision-makers to be able to preview the likely downstream impacts of decisions before those decisions are made, not in a way that involves supposition and unsupported assertion, but in a way that can be tested with some confidence. In the management of military capability, system dynamics modelling offers opportunities for developing unprecedented insights regarding changes over time, and significantly improving the quality of capability management decisions.

ELEMENTS OF MILITARY CAPABILITY

The relationship between force structure, preparedness and military capability is shown in Figure 1 [3,4].

In this most basic model of force structure and preparedness in military capability, elements are described as action statements or ‘calls to action’—things that capability managers must do continually. Here ‘maintain’ means more than the dictionary definitions of ‘continuing one’s action in...’, or, ‘retaining in being...’; it requires a form of management able to cope effectively with continuous change, uncertainty, and, often, situations not previously encountered. It is difficult to gain real experience leading to in-depth understanding of the dynamics, the effects of uncertain or incommensurable lead-times and the manifestations for dynamic feedback. Feedback occurs when part or all of a system re-enters as the input. Feedback is also used to describe the return of information to influence the next stage in the system. Because today’s decisions may not produce outcomes for years, opportunities for learning from experience can be few. Further, there can be manifold, and

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