

MEASURING THE AGILITY OF NETWORKED MILITARY FORCES

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Abstract. Agility is regarded as important by many modern Defence forces, but the concept of agility is defined in many different ways. Flexibility, speed, and adaptability are some of the characteristics often associated with agility. In this paper, we outline a taxonomy which distinguishes six kinds of agility: tactical/operational agility, organisational agility, deployment agility, sustainment agility, acquisition agility, and conceptual agility. We describe some candidate metrics for the first two kinds of agility, and provide a number of examples illustrating them. These metrics can be used as a starting-point for dialogue on trade-offs between the different kinds of agility.

INTRODUCTION: WHAT IS AGILITY?

Like other militaries, the Australian Defence Force (ADF) is committed to producing a more agile force in the next two decades. As the *Enabling Future War Fighting: Network Centric Warfare* document [1] states:

“Agility allows forces to cope with the unexpected ... NCW [Network Centric Warfare] is central [to agility] as it will enhance the commander’s situational awareness and therefore their ability to anticipate change.”

Agility has been defined as the combination of robustness, resilience, responsiveness, flexibility, innovation, and adaptation [2]. The US Army defines agility more simply as *“the ability of friendly forces to act faster than the enemy”* [3].

Other, richer, definitions of agility exist in a range of different communities, from business to aircraft design. The definition of agility presented here integrates several such definitions into a single coherent concept. In order to determine whether planned military projects will contribute to agility, it is necessary to have **metrics** which measure the agility of a force. This paper represents a step towards the development of such metrics.

The prototypical example of agility is a man standing on a road with a large truck bearing down on him, as in Figure 1. Agility in this scenario means the ability to see or hear the oncoming truck, and to run or jump out of the way before being run over. This example also shows that agility involves a trade-off between, on the one hand, situational awareness (at what distance does the man see or hear the truck?), and on the other hand, speed of movement (how fast can the man move out of the way?). Better situational awareness means that speed of movement is less critical, and vice versa. In this scenario, the man’s agility is also improved if he has additional response options, such as being able to fly out of the way.

Our prototypical example of agility serves as a metaphor for several levels of agility in the military universe: tactical/operational agility, organisational agility, deployment agility, sustainment agility, acquisition agility, and conceptual agility. In all of them, a military agency must avoid being hit by a metaphorical truck. The contribution of agility to mission effectiveness comes from flexibility in applying and directing force capabilities. Agility is complementary to two other factors contributing to mission effectiveness:

- Capability **strength**, which refers to the size of a capability, such as the number of hospital beds for a

medical mission, or the number and size of bombs on a platform for a strike mission.

- Capability **depth**, which refers to the duration for which a capability can be sustained, determined by such factors as supplies of ordnance, fuel, and replacement personnel.

The OODA Loop

Creating an agile force requires speeding up the so-called OODA (Observe, Orient, Decide, Act) loop shown in expanded form in Figure 2 (loosely based on [27]). The first part of the “Decide” step is the generation of several action options. In practice, this can be rapid, but possibly less effective, if only one option is generated and is then adapted to fit the situation (“fast and frugal” decision-making). However, if adapting this option to fit the situation is difficult, then the speed advantage of generating only one option is lost. The “Decide” step is in general slower, but possibly more effective, if several options are generated, and the best one chosen (“deliberate” decision-making). An agile force will be usable in a wide range of different action options, and hence can be used without the complexity of adapting an inadequate “best option.” Thus, an agile force both simplifies the generation of feasible options, and reduces the effort in adapting the selected option for use.



Figure 1. Prototypical agility example.

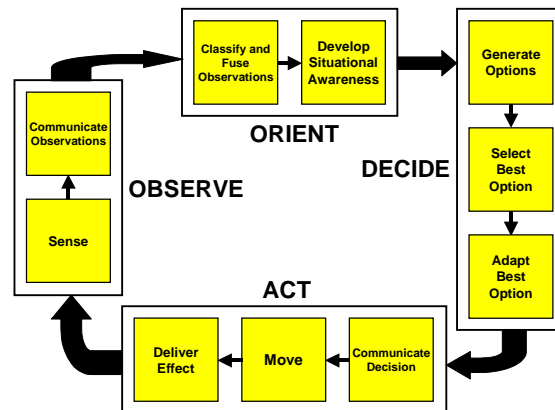


Figure 2. Expanded OODA Loop.

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