

CENTRALISATION AND DECENTRALISATION IN NETWORK CENTRIC WARFARE

Anthony H. Dekker¹

Abstract. In this paper, we examine the spectrum of choices between organisational centralisation and decentralisation in the presence of emerging trends in communications, information-processing, and sensor technologies. These technologies are important drivers in the current move towards Network Centric Warfare (NCW), and raise the question: should the new networks being developed be used to enable greater centralisation, or greater decentralisation? We reduce the choice to six basic questions (covering issues such as facilities, information availability, communications, and time constraints), and examine how the answers to these questions are impacted by technological change. Our analysis suggests that most new technologies can support both centralisation and decentralisation. As a result, over coming decades, the choice will be increasingly determined by a purely theoretical question, namely the possibility of a “global optimum”. This in turn is based on characteristics of the air, maritime, and land environments, with a global optimum more likely in the air and maritime environments, and less likely in the land environment.

INTRODUCTION

Within the military sphere, as in business, a consensus has developed over many decades regarding the relative benefits of centralisation and decentralisation [1]. Some decisions have proven best handled by a senior general in a central headquarters. These decisions are typically those where a *global optimum* is required, that is a “best possible” solution based on the entire “big picture.” Making high-level centralised decisions is usually called “planning.” Other decisions have proven best handled by tactical warfighters: pilots, soldiers, and naval personnel. These have generally been short-term urgent decisions. Yet other decisions are handled somewhere in between these extremes. However, this consensus must be re-evaluated in the light of the emerging trend towards network centric warfare (NCW).

NCW is the military equivalent of e-business. It involves taking advantage of a network linking information sources (sensors), information users (shooters), and information transformers/planners (command-and-control nodes). In the words of Alberts *et al* [2]:

“We define NCW as an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization. In essence, NCW translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace.”

| | |
|-----|---|
| I | Where are the facilities for decision making located? |
| II | Is a global optimum necessary? |
| III | Is a global optimum possible? |
| IV | Where is the necessary information for decision making available? |
| V | Within what timeframe must decisions being made? |
| VI | What communications infrastructure is available? |

Table 1. Six key questions for choosing between centralisation and decentralisation.

SIX KEY QUESTIONS

In order to select a balance between centralised and decentralised decision making for a particular task in an NCW environment, we pose six key questions (Table 1). These questions cover the practical and theoretical reasons for making centralised or decentralised decisions, and the constraints on communicating those decisions to the tactical units executing them.

We now consider these (inter-related) questions in detail.

(I) Where are the Facilities for Decision Making?

A central headquarters is often well-equipped with facilities for decision making. Located in a relatively safe rear position, staff are free from the distractions of ordnance flying past their heads. Increased space allows more staff to deal with complex decisions, and allows better *information management*, with maps on walls, TV screens, and computers readily available.

As an example, an AWACS (Airborne Warning and Control System) aircraft is currently the best place to make decisions about overall deployment of a team of fighter aircraft (Figure 1). Flying to the rear of the main battle, and protected by a fighter escort, the AWACS staff are free from the tactical distractions suffered by fighter pilots. An AWACS aircraft such as the Boeing E-3C has room for 17 surveillance and control staff, and a large number of computer displays. In contrast, an individual fighter pilot does not have the time or the facilities to deal with the “big picture” of air combat (there are additional reasons for using AWACS aircraft, and we touch on these later in relation to questions II to VI).

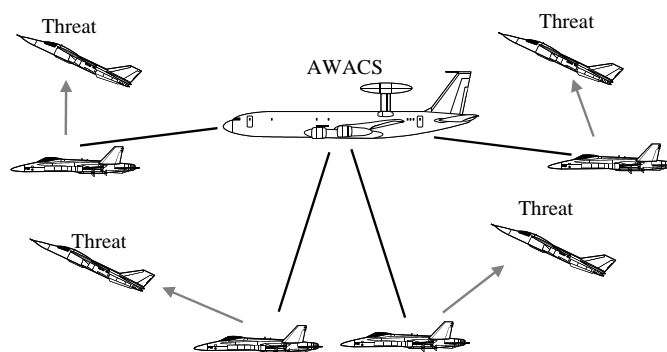


Figure 1. AWACS concept of operations.

¹ Defence Science and Technology Organisation (DSTO) Fern Hill, Department of Defence, Canberra ACT 2600, Australia.