

TOWARDS BETTER KNOWLEDGE: A FUSION OF INFORMATION, TECHNOLOGY, AND HUMAN ASPECTS OF COMMAND AND CONTROL

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Abstract. The impending advent of digitization has fuelled interest in all components of military command and control (C2) and there is growing awareness of the importance of human issues relative to C2. A number of human behavioural aspects (such as individual and team decision processes, shared situational awareness, management of information) significantly impact upon the effectiveness of C2 but are, at present, poorly understood. This paper discusses these human aspects of C2 in some detail, assesses their relative impact, and presents a simple model of the interaction between the information, infrastructure and intangible issues associated within a command post.

In an age when new electronic marvels are being introduced almost daily and thus the gadgets in current military use are out of date, it is easy to forget (and it has often been forgotten) that command, rather than being simply an assortment of technological marvels around which organisations and procedures are built, consists of a series of processes - each of them as old as war itself - by which the technological means at hand are pressed into service. [1]

INTRODUCTION

The impending advent of digitization has led to considerable interest in all aspects of military command and control (C2). Whilst digitization is a driver, it also presents constraints and opportunities. Some constraints may impose limitations on the way that military business is conducted. It is hoped that some opportunities will lead to significant improvements to operational effectiveness. Not least, the deployment of considerable quantities of information technology (IT) on the battlefield is forcing a detailed examination of C2 processes, since the IT must be designed to support these processes.

Current procurement plans include highly significant investment in battlefield IT. However, planned expenditure for research examining human aspects is on a considerably more modest scale. For reasons that will become apparent, this is not surprising. However, the rationale is not entirely sensible. Even a superficial examination of the 'business' of C2 reveals a number of human behavioural aspects that have significant impact on the effectiveness of C2 but are, as yet, poorly understood¹. Technology is never a be-all and end-all. As Van Crefeld states in arguably the most widely respected and quoted volume on command in war: '(S)ince a decisive technological advantage is a fairly rare and always temporary phenomenon, victory often depends not so much on having superior technology at hand as on understanding the limits of any given technology, and on finding a way around these limitations.' [2]

¹ This paper represents the output of one years' consideration of human aspects of C2 by a sub-group of the Industry-MOD Command and Digitization Working Group (IMCD). The IMCD is a multidisciplinary group of interested parties from the MOD, Industry and Academia. It is supported by the MOD through the staff of the Director of Corporate Research. The IMCD's HQ Organisation and Structures Sub-Group (HQOSSG) specifically considers the analytical and human factors issues affecting CP design and effectiveness. It largely, but not exclusively, focuses on land tactical CPs.

SCOPE AND PURPOSE

This paper discusses human aspects² of C2, assesses their relative impact, and presents a simple model of the interaction between the information, infrastructure and intangible issues associated within a command post³.

The purpose of this paper is to promote a better understanding of the human aspects of C2. The eventual purpose of C2 is to bring about military success. Consequently, the discussion presented in this paper is characterised by relevance to military outcome, a perspective that often seems missing from works on C2 development.

EMERGENT PROBLEMS IN C2

There is a growing awareness of the importance of human issues in C2. Were that not so, it is unlikely that RMCS Shrivenham would have commissioned a *Symposium on People in Digitized C2*; nor that the Royal United Services Institute would have run an event entitled *Battlespace Digitization. The Human Factors* in November 2000. Similar conferences have taken place in The Hague and Toronto within the last two years. This emphasis on human aspects probably implies that the solution to some capability requirements lies in better doctrine, training, or organisation, rather than in new equipment. This section highlights a number of emergent problems related to digitization and suggests that many have roots in human components of C2.

British Military Doctrine states that the three aspects of command are leadership, decision making and control of assigned subordinates [3]. Of those, *leadership* is not considered to be primarily relevant to information systems (IS) provision. *Control* in many ways reduces to making and enforcing second and third-order decisions relating to the co-ordination and synchronisation of subordinate's actions. Hence, in many ways, the key aspect of C2 in this context is *decision making*.

² The term 'human aspects' is used to refer globally to: all disciplines traditionally considered as 'human sciences', and wider human-centred issues such as military doctrine, training and education. It includes collective human aspects such as sociology (the study of human institutions) and anthropology (the study of human culture). It is intended to be considerably broader than the term 'human factors', which is in practice applied to a fairly narrow (but pertinent) range of ergonomics, human physiology and human-computer interface issues.

³ C2 is generally considered here in terms of land tactical operations in a warfighting context, but is not intended to apply exclusively to that case.