

SOFTWARE ENGINEERING OR EVOLUTION ? THE BATTLE FOR AN ARMY COMMAND SUPPORT SYSTEM

Peter L. Lambert

Abstract. The Australian Army has been attempting to develop a computerised command support system since the mid-1970s and appears to have finally succeeded with the 1999 deployment of the Battlefield Command Support System (BCSS). The development path was a long and difficult one, beset by the nature of the software engineering approach, challenged by the rapid explosion of information technology and constrained by the nature of relationships between the user, sponsor, acquirer and developer. This paper describes the background to the development of the Australian Tactical Command Support System (AUSTACSS) and its eventual evolution into the Battlefield Command Support System. The paper also outlines the new management approaches, evolutionary development principles and contractual arrangements utilised to produce success and win the battle for an Army command support system.

INTRODUCTION

The Australian Army has pursued the development of a computerised command support system since the mid-1970s. The concept for computerised support to command and control originated during the Vietnam War, after a Defence Science and Technology Organisation (DSTO) computer was deployed in support of intelligence operations. The Army developed a capability proposal for the Australian Army Tactical Command Support System (AUSTACSS), the first phase of which was approved by Government in 1983. At around the same time, the information technology revolution was beginning to accelerate. However, system development methodologies for evolving systems that could cater for rapid technological change had not yet been developed. Consequently, the evolution and development of AUSTACSS was bound to have the difficulties, both within the Defence Department and industry, that almost led to its failure.

AUSTACSS was initially developed under a classic "waterfall" development methodology. The development plan involved three sequential phases; a feasibility study phase, a requirements analysis phase and a development phase. When it commenced it was considered that a fully bespoke software development would be required. When the project reached the development phase in 1992, a firm price contract and fixed specification was used to engage the prime systems integrator and developer. By 1996, the project had delivered a mix of Commercial-Off-The-Shelf (COTS) products and more than 600000 lines of bespoke code. While the product met the original specification and had some very successful components, it no longer met overall user needs or expectations. In 1998, the project was revamped to be come a purely COTS integration and high-level applications development project, changing its name to the Battlefield Command Support System (BCSS). At the same time, in response to user requirements and the emerging Defence Common Operating Environment¹ (COE), the system moved from Unix to Windows NT. The BCSS project successfully delivered COTS based systems to users in 1999.

This paper examines the development of the AUSTACSS and BCSS projects and describes the difficulties that arose and the solutions that were adopted to overcome them. Consideration includes the software development, project

management and contractual issues involved in managing a complex software and hardware project.

AUSTACSS FEASIBILITY STUDY AND REQUIREMENT ANALYSIS

In 1984 and 1985 the feasibility study looked at the fundamental concepts of a command and control system and concluded that a single, integrated command and control system was required. The study also recommended the adoption of a common architecture for all of Army's battlefield command support systems [1]. The feasibility study established a testbed that was collocated with the headquarters of the then primary user, Headquarters 1st Division. The testbed was utilised to establish the user requirements for the military operations and intelligence functionality of the overall system. In so far as a generic system and functional requirements could be determined with the level of technology available to the testbed, this phase was successful.

At that time the user community in Headquarters 1st Division had virtually no computing systems, so the user had no framework for comparison with other systems. The testbed utilised systems that were at the leading edge of available computer technology. Even so, this technology was initially based around centralised computing systems using terminals with limited graphics or windows type capability. The limited human-machine interface and relative unsophistication of software meant that user requirements development focussed on capturing the existing military processes rather than considering how computing systems might enable new ways of doing business. The users' unfamiliarity with the potential business changes offered by computing systems and the desire for manual reversion as a redundancy measure led the Army to insist that AUSTACSS "...must be entirely compatible with the manual system" [1]; a goal which was later to constrain development flexibility.

The second phase was the requirement analysis phase and utilised the same contractors. Utilising the testbed to engage the users at Headquarters 1st Division, a detailed AUSTACSS Requirement Specification (ARS) was developed over the period 1986-87. Software was developed on the testbed to confirm and evolve user requirements. The ARS produced was an eleven-volume document with a further four volumes of supporting documents. It provided a highly detailed and complete description of the requirements at that time. They covered the operational environment, operational requirements, functional requirements, performance

¹ The specific technical implementation of COE at any one time of in use throughout the Defence environment managed by the Defence Information Systems Group is known as the Standard Operating Environment (SOE).