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## TECHNOLOGIES FOR ADVANCED LAND COMBAT

### INTRODUCTION

It is a pleasure to introduce this collection of papers presented at the Critical Review of Technologies for Advanced Land Combat, held 17 - 18 April 1995, in Orlando, Florida. This review is as timely as the technologies presented herein, as the U.S. science and technology community is called to address the challenges of the digital battlefield for the year 2000. The most recent guidance from the U.S. Army Training and Doctrine Command (TRADOC) emphasizes the need for U.S. forces to be lethal, survivable, and increasingly capable against threats which have evolved from the historic "single enemy" to today's multiplicity of global trouble spots.

The overarching document describing the Army operational concept for the next century, "Force XXI Operations" (TRADOC Pamphlet 525-5, 1 Aug 1994,) describes the conceptual foundations for the conduct of future operations in war and in military operations other than war (MOOTW). The Army, as defined in this concept, includes the active Army, Army Reserve, Army National Guard, and Department of the Army civilians. These U.S. forces are increasingly called upon to respond to "non-traditional" functions including peacekeeping and other MOOTW. The challenge associated with MOOTW is to ensure that U.S. forces remain the best equipped, most capable in the world, while ready to meet any challenge.

This collection of papers discusses future requirements for advanced land combat. The papers identify emerging technologies which are poised to address these requirements, and describe activities designed to show the combat worth, or value added, of these capabilities when applied to U.S. land forces. The proposed applications are hosted on various platforms ranging from unmanned ground vehicles to manned rotary wing aircraft. Recurring themes include advances in battle command (i.e., command and control systems), situational awareness, active control, and data fusion.

The program areas participating in this Critical Review provide technology solutions across a broad base of applications for mounted and dismounted forces. The objectives of the Advanced Vehicle Technologies program are to lighten and digitize future armored / mounted forces.

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These vehicular technologies and simulations combine both inter- and intravehicle digitization and communications while focusing on the Army's Force XXI goals.

The Rapid Force Projection Initiative (RFPI) Advanced Concept Technology Demonstration, one of nine Advanced Concept Technology Demonstrations approved by the Office of the Secretary of Defense (OSD), integrates and demonstrates advanced technology solutions for the U.S. early entry forces. National defense strategy requires that the United States possess highly lethal, rapidly deployable forces which can conduct operations immediately upon arrival. The situations encountered during the early phases of Operation Desert Storm illustrate the potential vulnerabilities of our light forces when deployed against an armored or mechanized threat. In general, these forces deploy on tactical transport aircraft with minimal organic fire support. In response to this challenge, RFPI technologies must meet these constraints while providing increased survivability, lethality, target acquisition, and improved command tempo for early entry task forces.

Advanced simulation and modeling methods are viewed as enabling technologies. Advanced techniques, including the application of Distributed Interactive Simulation (DIS), are used throughout the programs reviewed to multiply the effect of analysis and demonstration in a cost effective and reconfigurable manner. The application of early simulation during the conduct of these programs results in significant savings of resources while providing opportunities for developer and user community feedback early in the technology development process. Many of the technologies are also applicable to dual use and commercial-off-the-shelf applications, thereby providing opportunities for the rapid dissemination of defense technologies for application to non-defense related problems.

We gratefully acknowledge the time and effort offered by each of the authors and presenters, and appreciate the assistance provided by the SPIE staff in the organization of this Critical Review. We anticipate that the collected papers in this volume will provide a valuable tool for Critical Review participants as our nation faces the challenges of the twenty-first century.

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Gerald R. Lane  
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