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# Weapons Training Simulation System

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Requirements Planning and Impact on Readiness of Training Simulators and Devices  
Interactive Simulation Training System for the Objective Individual Combat Weapon

System

Simulation System Programming Design Manual

DA Pam

Department of Defense Authorization for Appropriations for Fiscal Year 1986

Coordinamento degli isolamenti e sovratensioni di origine interna

Descriptive Summaries for Program Elements of the Research, Development, Test and Evaluation, Army Program FY ... (U).

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The purpose of the present paper is to describe the Multipurpose Arcade Combat Simulator (MACS) currently being developed by the Army Research Institute, Fort Benning Field Unit. MACS represents a low-cost training/simulation alternative which can eventually be adapted to a variety of weapon systems. Currently, the hardware consists of a microcomputer, disk drives, Pascal language card, joy sticks, a light pen, and dummy weapons. The light pen has been fitted with corrective lenses in order that accurate readings can be taken at a range of 10 ft. The light pen currently can be mounted to either a dummy M16A1 rifle or an expended M72A2 Light Antitank

Weapon (LAW). The system provides immediate visual and auditory feedback of hit/miss shot location. In addition, the system can provide training in traditionally difficult to train areas such as the effects of wind and moving target engagement. Current and planned training software are discussed in detail. Other possible advantages of the MACS system which are addressed in this paper include cost savings, weapon training for components with limited ranges (e.g., ROTC, USAREUR, and Reserve Components), implications for mobilization, and the additional training flexibility provided by the MACS system. Additional keywords: Markmanship; Weapons training. (Author).

Department of Defense Appropriations for Fiscal Year 1991: Department of Defense; National Guard and Reserve Forces A

Multipurpose Arcade Combat Simulator (MACS). The purpose of the present paper is to describe the Multipurpose Arcade Combat Simulator (MACS) currently being developed by the Army Research Institute, Fort Benning Field Unit. MACS represents a low-cost training/simulation alternative which can eventually be adapted to a variety of weapon systems. Currently, the hardware consists of a microcomputer, disk drives, Pascal language card, joy sticks, a light pen, and dummy weapons. The light pen has been fitted with corrective lenses in order that accurate readings can be taken at a range of 10 ft. The light pen currently can be mounted to either a dummy M16A1 rifle or an expended M72A2 Light Antitank Weapon (LAW). The system provides immediate visual and auditory feedback of hit/miss shot location. In addition, the system can

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survivability of United States service members on the modern battlefield. The objective of this research paper to identify a comprehensive training simulation design/system, capable of adequately addressing the operational needs for training the unique, interactive, simulation training requirements of the OICW. Specifically, it identifies industrial capability and related technology to provide state-of-the-art solutions to support personnel training on the revolutionary weapons system known as the Objective Individual Combat Weapon and its ancillary munitions. Though the enhanced capabilities of the OICW are indeed revolutionary, so too are the multifaceted challenges ushered in with this new weapons system. Perhaps the biggest challenges facing the OICW are the training and associated cost considerations. These cost factors are further complicated by the time requirements involved in training this unique and highly sophisticated weapon system. The focus must not be limited to simply establishing the best means for achieving training proficiency, but

on the long term goal of determining the best means for maintaining and sustaining that desired level of proficiency. As with any sophisticated system, more cognitive skills are required (in addition to the basic motor skills of the conventional weapon system). Similarly, when learning a more sophisticated system, comes a higher degree of perishability, the decay or memory loss associated with these learned skills if not properly or frequently exercised. Weapons Simulation Tracking Systems (Testing Methods). As small arms weapon simulation systems are increasingly employed by military and law enforcement agencies, requirements and specifications for weapon tracking systems need to be addressed. The integration of weapon tracking systems is hampered by a lack of standardized methods for their testing and analysis. This report documents suggested standardized test procedures for evaluating position/orientation tracking systems relative to their ability to perform in Weapons Fire Simulators. Discussions are provided on tracking

system basics including: the terminology used in tracking systems, the different tracking types and technologies, and weapon fire simulation requirements. A computer controlled motorized linear track was used to evaluate performance characteristics of weapon tracking systems. The evaluation discussion includes: the definition of the parameters to be tested, the equipment and procedures to be used, and the analysis of the data recorded. Data is collected to evaluate the parameters of resolution and accuracy for both position and orientation. Two distinct weapons tracking cases are tested for accuracy: static and dynamic. These two cases evaluate a tracker's use in marksmanship training, where the weapon is barely moving, and tactics training, where the weapon is moving at moderate to high angular and translational rates. Procedures are provided for each test, describing the data to be collected and the calculations to be performed. These procedures have been integrated into a tracker test program that collects the data while controlling the test track and tracking system. Appendices are

included that provide an overview of the tracker test program, a sample test plan, and sample tracker test program outputs. Requirements Planning and Impact on Readiness of Training Simulators and Devices Computer training simulations consist of hardware and software designed to show a concept or to simulate an operational environment for training purposes. Overall acquisition of training systems by the Military Departments now exceeds \$1.5 billion per year. The Army Close Combat Tactical Trainer is estimated to cost more than \$1 billion. The following two types of simulation exist: System-specific computer training simulations support training for a specific weapon system. For example, the Army AH-64 Mission Simulator trains for in-flight and weapons delivery, emergency procedures, and sensor system operations. Non-system specific computer training simulations can support training for a single, specific weapon or equipment system. The Army Close Combat Tactical Trainers will simulate the integrated performance of a variety of weapon systems. Audit

Objectives. The audit objectives were to evaluate the acquisition process for training simulators, computer training simulations, training devices, and adequacy of the management control program as it applied to the primary audit objective. Jane's Military Training and Simulation Systems Coordinamento degli isolamenti e sovratensioni di origine interna Effects of Recoil on Rifle Marksmanship Simulator Performance This report determines if the accurate reproduction of a rifle's recoil is a necessary feature of a rifle marksmanship simulator, this research was conducted with 24 adult volunteers in a military research organization. Each research participant fired 12 shots at silhouette targets presented on the Multipurpose Arcade Combat Simulator (MACS), whose demilitarized M16A1 rifle was equipped with a five-stage solenoid recoil mechanism developed by Larson Electronics, Inc. Six of these shots were fired with recoil and six were fired without recoil. In each recoil condition, three shots were fired

from a supported firing position and three were fired from an unsupported position. The presentation sequence of the recoil and firing position conditions was counterbalanced across firers. In terms of both movement before the shot and accuracy, marksmanship simulator performance was not found to differ significantly as a function of recoil. As expected, recoil resulted in significantly greater movement after the shot, because of the introduction of rifle movement by the recoil mechanism itself. Consistent with previous research in the areas of classical conditioning and simulator fidelity, these findings suggest that the accurate reproduction of recoil is unnecessary in rifle marksmanship simulation. Keywords: Rifle marksmanship training, Simulator fidelity, Training devices, Weapons training, Simulation. Department of Defense Appropriations for Fiscal Year 1999 Development and Use of Training Simulators Weapons Simulation Tracking Systems (Testing Methods) As small arms weapon simulation systems are increasingly

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factors information which influences the design and construction of training devices. Successive chapters of the report are devoted to determining training needs, developing the environment for learning, understanding simulation requirements for training, developing a measurement capability, and discussing the human engineering problems in trainer design. As it provides a considerable background of human factors information pertinent to the synthetic ground environment, this report will be of interest to individuals directly concerned with Weapons System Training programs, preparing trainer specifications, developing training standards, and testing and evaluating simulation equipment. (Author). Defense Department authorization and oversight Virtual Environments for Infantry Soldiers "This report describes the work on a Science and Technology Objective (STO) entitled Virtual Environments for Dismounted Soldier Simulation, Training and Mission Rehearsal. The four-year (Fiscal Year FY 99-FY 02) STO effort was proposed to address a

range of U.S. Army future operational capabilities described in U.S. Army Training and Doctrine Command (TRADOC) Pamphlet 525-66 (U.S. Army Training and Doctrine Command, 1997). The STO activities and goals were focused on overcoming critical technological challenges that prevented effective Infantry Soldier simulation. The U. S. Army Research Institute for the Behavioral and Social Sciences (ARI) led a team of both government and industry developers in examining simulation capabilities for industry. The other government partners vent the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM) and the U.S. Army Research Laboratory Human Research and Engineering Directorate (ARL-HRED) and Computational and Information Sciences Directorate (ARL-CISD). Each of the major players had a particular area of interest but all worked together to explore concepts and systems and to recommend directions for further work on training, concept development, and mission rehearsal."-- DTIC. Department of Defense Appropriations

for 1990: Chemical weapons and demilitarization Federal Register Military Review Simulation System Programming Design Manual Department of Defense Appropriations for Fiscal Year 1991: Department of Defense; National Guard and Reserve Forces Engagement Simulation for Armored Cavalry: Initial Test ARI developed the tactical engagement simulation training method known as REALTRAIN, which provides extremely realistic and motivating training for small combat arms units. This document describes the initial stages in developing REALTRAIN for armored cavalry units--specifically, to examine procedures for emphasizing reconnaissance functions in engagement-simulation exercises and for incorporating reconnaissance functions into the controller debrief and After Action Review. Also examined were controller procedures and the control system, and the effectiveness of weapons effects and signature simulators for armored cavalry weapons. Procedures and techniques were devised and refined for (a) training

controller personnel; (b) assessing casualties in desert terrain, using optical devices and map coordinate information; (c) encouraging appropriate information-gathering and -reporting behaviors in reconnaissance missions; (d) employing mortar elements; (e) delivering indirect fire simulators by helicopter; (f) simulating effects and signatures of organic weapon systems; (g) collecting training data for use by senior controllers in After Action Reviews; and (h) preparing exercise sketches and narratives for training and research purposes.

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*Department of Defense Appropriations for ...*

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**Department of Defense**



**Appropriations for 1990: Secretary and Chief of Staff of the Army**

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**Department of the Army Pamphlet**

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*Combat Simulator (MACS).*

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