CLOSE COMBAT TACTICAL TRAINER (CCTT)

Army ACAT II Program

Total Number of Systems:	9 fixed sites 12 mobile platoon sets
Total Program Cost (TY$):	$850M
Full-rate production:	4QFY99

Prime Contractor

Lockheed Martin

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Close Combat Tactical Trainer (CCTT) is a combined arms tactical training simulator designed to assist armored and mechanized infantry units in training for combat. The use of the Abrams Tank and the Bradley Fighting Vehicle simulators to train soldiers in maneuver and in command and control, while operating in a combined arms environment, is a central component of the ***dominant maneuver*** force.

The CCTT system consists of a group of fully interactive, networked simulators and command, control, and communications workstations. The system will replicate—via individual manned simulators—the Abrams tanks, Bradley Fighting Vehicles, as well as other vehicles and weapon systems found in or supporting an armored or mechanized infantry company team. CCTT is designed to train from crew level through company/team level. Additionally, CCTT supports the training of selected battalion level

tasks. CCTT simulates, in real-time, the conduct of combat operations under varying conditions of visibility and weather. An appropriate and challenging opposing force requires realistic individual, crew, and unit actions. This simulation will permit soldiers to train with reduced real-world restrictions caused by weapon effects, safety, and terrain limitations.

CCTT exists in both fixed-site and mobile versions. The fixed-site version is capable of running five simultaneous platoon-level exercises. The mobile version is road transportable within the United States to provide reserve forces platoon-level training.

BACKGROUND INFORMATION

In May 1992, the Army authorized CCTT to proceed into the EMD phase of acquisition. CCTT IOT&E was conducted from December 1997-June 1998. During this test, baseline performance data were collected at the National Training Center (NTC) from three battalion task forces that did not use CCTT in their training prior to deploying to NTC. Subsequently, a unit that used CCTT in its training prior to deploying to NTC completed a similar series of training exercises. The criteria used to determine CCTT effectiveness were whether units trained with CCTT performed at least as well as units trained without CCTT. At the National Training Center, the performance of CCTT-trained companies exceeded the performance of the baseline companies. The CCTT-trained platoons performed at least as well as the baseline platoons.

During IOT&E, CCTT suitability data were collected over an 11-week period at the Ft. Hood fixed site using company-sized units. While the system met many of its suitability requirements; e.g., completing 90 percent of its training exercises without a system abort, none of the manned modules met the reliability requirements. Overall, the system demonstrated a 42 percent probability (versus a 90 percent requirement) that no more than 10 percent of each type of manned module would be down for more than 30 minutes during a normal training day. Additionally, as a result of system function failures, CCTT experienced frequent short duration interrupts that were excessively disruptive of unit training.

Based upon system performance during IOT&E, the Director assessed CCTT as operationally effective, but *not operationally suitable* in his November 1998 B-LRIP.

In November 1998, the AAE authorized full-rate production for CCTT, while directing that CCTT demonstrate operational suitability prior to fielding.

FOT&E 1A was conducted in March 1999 at Ft. Knox, KY. This event was designed to assess CCTT's new image generator as well as its progress towards reducing so-called vehicle flips through improvements in the vehicle dynamics model. Image generator lock-ups were the most frequent hardware failure noted during IOT&E while vehicle flips were the most frequent software failure. During FOT&E 1A, image generator performance was considerably improved over its IOT&E performance, with a demonstrated 73 percent reduction in image generator failures. Vehicle flips were also substantially reduced during FOT&E 1A. While the results of FOT&E 1A indicated that the program was making progress towards achieving operational suitability, this test was not designed to establish overall system suitability.

TEST & EVALUATION ACTIVITY

FOT&E 1B was conducted at Ft. Benning, GA, during July-August 2000 to re-examine suitability issues not met during IOT&E. During this four-week test, two armor and two mechanized infantry companies conducted platoon, company/team and battalion-level exercises designed to meet their specific training objectives. More battalion-level exercises were conducted during this test than during IOT&E, placing greater stress on the CCTT system. Based on a revised operational concept developed and approved by the Army, one of the suitability criteria was revised for the FOT&E 1B. The old criterion, which read: *the system will demonstrate a 90 percent probability that no more than 10 percent of each type of manned module at a given site are simultaneously down for more than 30 minutes during a normal training day,* was revised to read, *the system will demonstrate no less than 90 percent availability for each major subsystem during the normal training day.* This revision reflects the standard definition of operational availability.

TEST & EVALUATION ASSESSMENT

Based upon its performance during FOT&E 1B, DOT&E now assesses the CCTT system as *operationally suitable*. During FOT&E, the system demonstrated an operational availability for each major sub-system of 98 percent, versus the revised criterion of 90 percent. (CCTT would have met the original criterion as well). The system also met the criterion of completing 90 percent of its training exercises without a system abort by successfully completing 95 percent of the scheduled training exercises. Additionally, the frequency of short duration interrupts, which significantly disrupted training during IOT&E, was reduced by over 50 percent for company level exercises, from 6.5 interrupts per training session in the IOT&E to 2.3 interrupts during FOT&E. A similar 50 percent reduction was noted for platoon exercises, dropping from an average of 1.4 interrupts per platoon exercise during IOT&E to 0.6 interrupts during FOT&E. Significantly, based on user responses after FOT&E, the training unit did not view the short duration interrupts as having a negative impact on training, whereas during IOT&E user responses indicated that the level of short term interrupts were unacceptable.

The improvements demonstrated during FOT&E 1B are a direct result of improved overall system reliability. Mean Time Between Essential Function Failures (MTBEFF) increased significantly for the Abrams Tank and Bradley Fighting Vehicle manned modules. The Abrams module MTBEFF improved from approximately 30 hours to 100 hours while the Bradley module MTBEFF improved from 35 hours to 83 hours. The improvement in the failure rate for the image generators evident during FOT&E 1A at Ft. Knox continued during FOT&E 1B. Terrain data base software failures, which cause vehicles to flip at certain locations, continued at a rate comparable to that experienced during IOT&E. However, the low frequency of these interrupts did not significantly affect training.

Although DOT&E now considers the CCTT system to be operationally effective and suitable, the CCTT program must continue efforts to ensure CCTT's future effectiveness as a tactical trainer. CCTT must be updated as changes are made to currently fielded systems as well as when new combat systems are introduced. Upgraded combat vehicles, such as the BFVS-A3 and M1A2 SEP tank, as well as new platforms and weapons systems, must be incorporated into the system. ATTCS digital command and control capabilities will also need to be effectively integrated into CCTT. Maintaining weapons system currency will be critical to ensuring the continued viability of CCTT as a training tool.

The CCTT program also plans to implement a series of Pre-planned Product Improvements (P^3I) in the coming years. P^3I initiatives include improved after action review capabilities, new terrain data bases, and improved semi-automated forces. These P^3I efforts should be sustained. Additionally,

adequate T&E resources should be allocated by the Army to ensure all system upgrades are adequately tested.