

## BRADLEY FIGHTING VEHICLE SYSTEM-A3 (BFVS-A3)



### Army ACAT IC Program

Total Number of Systems:	1109
Total Program Cost (TY\$):	\$4052.5M
Average Unit Cost (TY\$):	\$3.218M
Full-rate production:	2QFY00

### Prime Contractor

United Defense, Limited Partnership

### SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The M2A3 and M3A3 Bradley Fighting Vehicle System (BFVS) are improved versions of the M2A2 and M3A2 BFVS. The BFVS-A3 includes enhancements intended to improve lethality, mobility, survivability, and sustainability. Additionally, these enhancements are intended to provide increased situational awareness and digital command and control capabilities necessary to provide *information superiority* to the *dominant maneuver* force. The Bradley Fighting Vehicle and the Abrams Tank are the two central components of the *dominant maneuver* digital force.

The mission of the Bradley Fighting Vehicle System is to provide mobile protected transport of an infantry squad to critical points on the battlefield and perform cavalry scout missions. The BFVS will also provide overwatching fires to support dismounted infantry and suppress or defeat enemy tanks and other fighting vehicles. BFVS-A3 enhancements include:

- Incorporation of Force XXI Battle Command, Brigade and Below (FBCB2) Integrated Combat Command and Control to share digital battle command information and situational awareness with all components of the combined arms team.
- The improved Bradley acquisition system and commander's independent viewer, both 2<sup>nd</sup> generation Forward Looking Infrareds (FLIR), to improve target acquisition and target engagement.
- A position navigation system with a Global Positioning System receiver and a backup inertial navigation system to enhance situational awareness.
- Integrated maintenance diagnostics and Built-In-Test/Built-In-Test-Equipment.

### **BACKGROUND INFORMATION**

In March 1994, the Army awarded a contract to United Defense, Limited Partnership to begin the EMD phase. Operational testing conducted prior to FY99 has included a Limited User Test (LUT)-I in December 1997 and an Operational Experiment (OE) in September 1998. The previously planned LUT II was redesignated as an OE due to the reduced scope of the test. Delays in the development and integration of platform software led to this reduction. The resulting OE was planned to consist of crew and platoon gunnery and limited force-on-force maneuver trials. Further delays experienced in the execution of the gunnery phase of OE resulted in the cancellation of the force-on-force maneuver phase.

The system LFT&E began with the Controlled Damage Test in September 1998, and the first of 19 full-up system level live fires shots in December 1998.

### **TEST & EVALUATION ACTIVITY**

A Detection, Acquisition, Recognition, Identification (DARI) test was conducted from October-November 1998 at Yuma Proving Ground, AZ. This test involved a side-by-side comparison between the BFVS-A3 equipped with 2<sup>nd</sup> generation FLIR and the baseline BFVS-A2 equipped with a 1<sup>st</sup> generation FLIR. The results of the DARI test demonstrated the significantly improved capability of the BFVS-A3 over the baseline BFVS-A2's ability to detect, recognize, and identify targets at operationally relevant ranges.

Limited User Test II was conducted from August-September 1999 at Ft. Hood, TX. LUT II consisted of both crew and platoon gunnery exercises involving a company of BFVS-A3's (fourteen vehicles) and a company of baseline BFVS-A2 Operation Desert Storm (ODS). The focus of LUT II was to assess whether BFVS-A3 possesses an increased capability over the BFVS-A2 ODS to acquire, engage, and hit targets. A preliminary analysis of the results of LUT II gunnery indicate that the BFVS-A3 demonstrated an improved capability to acquire, engage, and hit targets over the baseline BFVS-A2 ODS.

The first phase of BFVS-A3 Live Fire Test and Evaluation, the Controlled Damage Test, was completed in FY99. This effort used non-destructive test methods to insert potential damage mechanisms, such as electrical shorts, into the system. Eighteen of nineteen full-up, system-level live fire shots, across a variety of threat classes, were successfully completed in FY99.

In September 1999, the Commanding General, U.S. Army Test and Evaluation Command execute planned BFVS-A3 IOT&E in November-December 1999. This decision was made as a result of an assessment that the BFVS-A3 would not be ready to go to test due to a number of system software issues. Most notably, the program had not yet successfully integrated Embedded Battle Command (EBC) software, which supported the system's digital command and control (C2) links to FBCB2. As a result of the challenges with EBC, the program modified its technical approach to integrating digital C2. This new approach, called Integrated Combat Command and Control (IC3), is intended to perform the same digital C2 functions as EBC.

The BFVS-A3 IOT&E has been tentatively rescheduled for 4QFY00.

### **TEST & EVALUATION ASSESSMENT**

As noted above, the DARI test was successful and clearly established the superiority of the BFVS-A3 2<sup>nd</sup> generation FLIR's target acquisition capability in comparison to the currently fielded system.

DOT&E concurs with the Army's decision to delay BFVS-A3 IOT&E. IC3 is designed to meet a key system requirement for digital battle command and is the BFVS-A3 link to FBCB2. A full evaluation of BFVS-A3 requires that the system include functional, production-representative IC3.

Integration of IC3 remains the primary technical challenge to the program. While the BFVS-A3 program is responsible for integrating IC3 into the platform, it is dependent upon the timely delivery of IC3 software with full functionality from the FBCB2 program. The EBC software delivered to the BFVS-A3 program had been a prototype version without full functionality. For example, a number of core capabilities, such as the ability to handle unit task organization changes, have yet to be delivered. In addition, the BFVS-A3 program has not yet implemented the complete set of required 32 battle command messages. Also the capability to send digital map overlays has yet to be adequately demonstrated.

The full implementation of system maintenance diagnostics, both the on-board Vehicle Diagnostics and Maintenance System, as well as the off-board maintenance diagnostics equipment, remains a system challenge and is of particular interest.

Preliminary results from live fire testing have demonstrated a number of survivability improvements over the baseline system and suggested possible areas for improving vehicle survivability. Test results have also demonstrated the value of explosive reactive armor and led to further T&E activity in that area.

