Crewman’s Associate Advanced Technology Demonstrator Briefing

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TARDEC Crew Reduction Efforts

Evolving Knowledge and Technology “Baseline”

FY93
- Crewman’s Associate Simulation
- System Integration (Lab)
- Baseline Developed

FY96
- Vehicle Tech Demo #1 (VTT)

FY98
- Vehicle Tech Demo #2 (CAT ATD)

FY00
- Two Man Transition
  Future Combat System

FY04
FY06
Crewman’s Associate ATD

- The development of a crew station soldier-machine interface

- The integration of advanced technologies, such as aided target acquisition, integrated defense, combat ID, digital messaging, driver’s aids, etc.

- Two platforms (time frames) addressed:
  - Potential M1A2 (SEP) + (1998 technology)
  - Future MBT (2005 technology)
Motivation

- Weapon Status
- Intra-Vehicle Communication
- Map Information
- Battlefield Digitization
- Battlefield Communications
- Target Acquisition
- Monitor Instruments
- Crew Reduction
- Target Tracking
- Obstacle Avoidance
- Weapon Control
- Rough Terrain Maneuvering
- Advanced Sensors
- Day/Night & All Weather Operation

Motivation for crew reduction
Objectives

Increase Main Battle Tank operational effectiveness by:

- Decreasing engagement timelines
- Decreasing time required to create and send digital C2 reports
- Improving operations on the move
- Improving situational awareness
- Improving night operations
- Providing a User-friendly interface to the digital battlefield of Force XXI
- Improving CONOPs
- Reducing maneuver damage
CTT Design Methodology

Individual Steps or Complete Design Process Performed to Meet Project Goals
Crewstation Design Principles (Primary)

- Hands on primary controller
- All critical information in the primary vision zone
- One step functions
- Consistent Mental Model
2005 Crewstation

- 3-D auditory alerts
- Panoramic Display (PD) with side window displays (not shown)

- 3 identical Multi-Function Displays (MFDs)
- Programmable Display Pushbuttons (PDPs) access menus without consuming display space

- Voice recognition for limited C2 tasks
- Radio and HA switches

- Shared center console
- Yoke-type driving controller with targeting switches

- Traditional pedals for acceleration, braking
- Alphanumeric keypad

- Shared center console
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1998 Crewstation

3-D auditory alerts

Communications Panel

Warning Screen

3 identical Multi-Function Displays (MFDs)

Programmable Display Pushbuttons (PDPs) access menus without consuming display space

Removeable keyboard

Center-munted multi-function controller

HA Panel

Autoloader
1998 Driving Station

- Driver’s Navigational Display (DND)
- WACA
- Keyboard
- Gear Select
- Driver’s Vision Enhancer (DVE)
- Training Mode Select
- Master Power
- Personal Data Cartridge Reader
Crewstation Displays

Panoramic Display

- 180 degree indirect vision to the crew
- Inherent protection from directed energy weapons
- Seamless, closed hatch vision
- Common visual environment
- Located within the Primary Vision Zone.
Crewstation Displays

**Multifunction Displays**

- Display information from different subsystems: targeting, driving, command and control, tactical map, etc.

- Buttons on the top of the MFD select the displays functionality.

- Located within the Primary Vision Zone.

- Provide consistent mental model.
3D Audio Display
• A User-friendly interface to the digital battlefield of Force XXI
• A 65% decrease in the workload required to send C2 messages
• Improved situational awareness
• Improved operations on the move
• Improved night operations
• Reduced maneuver damage
• Improved CONOPs
Test Results
(Non-experimental analysis)

- Operations on the move have been improved due to:
  1) decreased steps required to execute tasks
  2) elimination of dragging the cursor
  3) all critical task on yoke

- The crewmen now have a simplified, User-friendly interface to the digitized battlefield of Force XXI.

- The ability to effectively perform continuous operations has been improved due to the decreased fatigue associated with operating this crew station.
Test Results
(Subjective Comments)

- The electronic map provided the most significant performance enhancement.

- The ability for each crewman to tailor his individual displays to suit his preferences was helpful.

- Digital C2 interface had a positive impact on performance, being easier and faster than M1A2.

- Aided target acquisition had a positive impact on performance.

- Combined interfaces and technologies provided the ability to rapidly convey the information required to control forces at the platoon and company level.
• Update Crewman’s Associate
  Crew Station Design
    - Lessons Learned
    - Technology Advances
    - Test Bed Costs
    - Test Bed Space
• Integrate into Bradley A0 Hull
  - Two Crew Stations
  - Supporting Technology
  - Supporting Subsystems

• Conduct Test Bed Workload
  Experiments and Technology
  Demonstrations in the Field
    - Side-By-Side
    - In-Line