



# Crewman's Associate Advanced Technology Demonstrator Briefing

---

Melissa Karjala

*Vetronics Technology Area*

U.S. Army Tank-Automotive RD&E Center (TARDEC)  
Vetronics Technology Area  
(AMSTA-TR-R, Mailstop 264)  
Warren, MI 48397-5000

**30-31 May 2001**

---

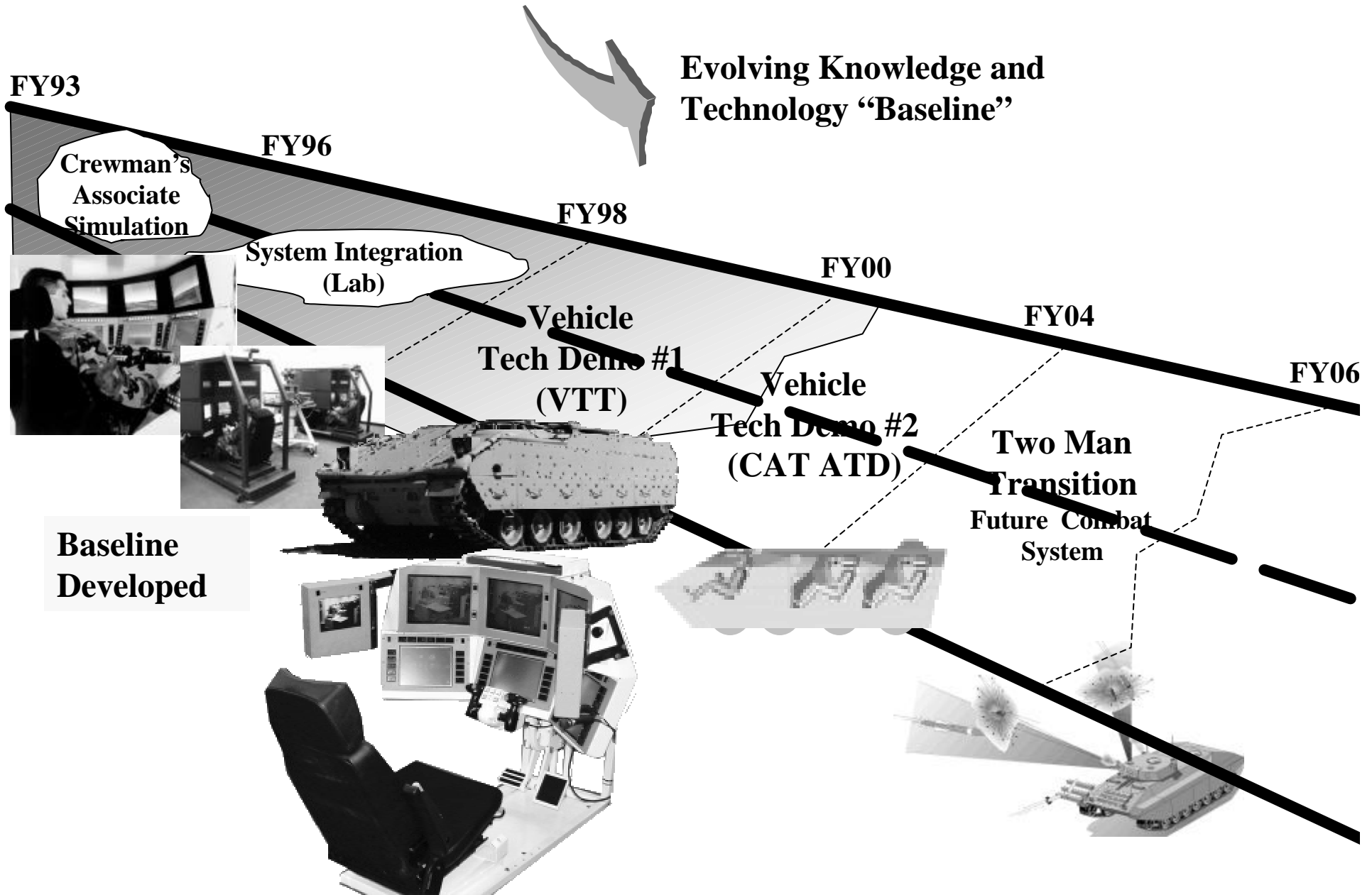
**UNCLASSIFIED**

Tank-automotive & Armaments COMmand

## Report Documentation Page

<b>Report Date</b> 30May2001	<b>Report Type</b> N/A	<b>Dates Covered (from... to)</b> -
<b>Title and Subtitle</b> Crewmans Associate Advanced Technology Demonstrator Briefing	<b>Contract Number</b>	
	<b>Grant Number</b>	
	<b>Program Element Number</b>	
<b>Author(s)</b> Karjala, Melissa	<b>Project Number</b>	
	<b>Task Number</b>	
	<b>Work Unit Number</b>	
<b>Performing Organization Name(s) and Address(es)</b> U.S. Army Tank-Automotive RD&E Center (TARDEC) Vetronics Technology Area (AMSTA-TR-R, Mailstop 264) Warren, MI 48397-5000	<b>Performing Organization Report Number</b>	
<b>Sponsoring/Monitoring Agency Name(s) and Address(es)</b> NDIA (National Defense Industrial Association) 211 Wilson BLvd., Ste. 400 Arlington, VA 22201-3061	<b>Sponsor/Monitor's Acronym(s)</b>	
	<b>Sponsor/Monitor's Report Number(s)</b>	
<b>Distribution/Availability Statement</b> Approved for public release, distribution unlimited		
<b>Supplementary Notes</b> Proceedings from 2001 Vehicle Technologies Symposium - Intelligent Systems for the Objective Force 29-31 May 2001 Sponsored by NDIA		
<b>Abstract</b>		
<b>Subject Terms</b>		
<b>Report Classification</b> unclassified	<b>Classification of this page</b> unclassified	
<b>Classification of Abstract</b> unclassified	<b>Limitation of Abstract</b> UU	
<b>Number of Pages</b> 18		

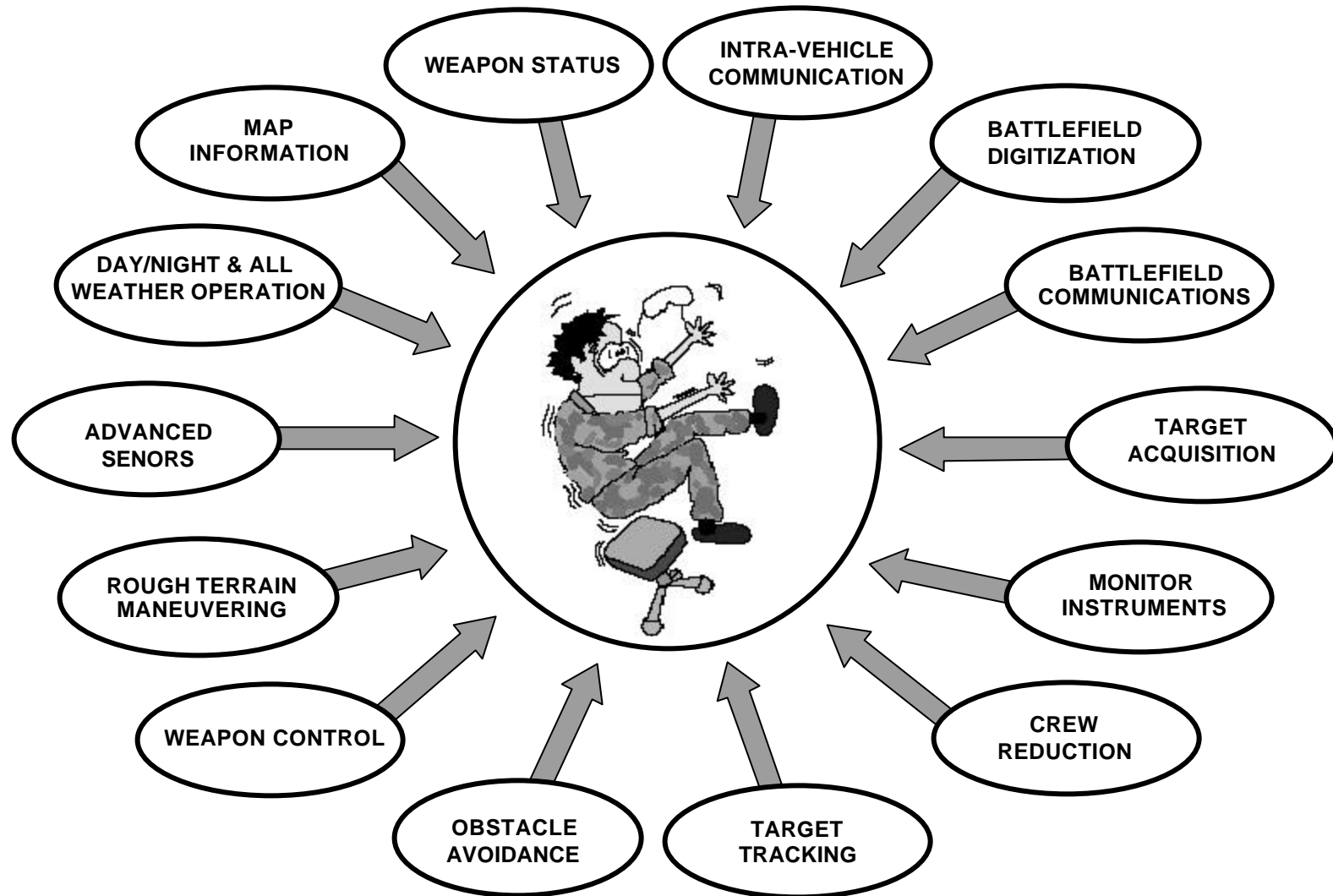
# TARDEC Crew Reduction Efforts



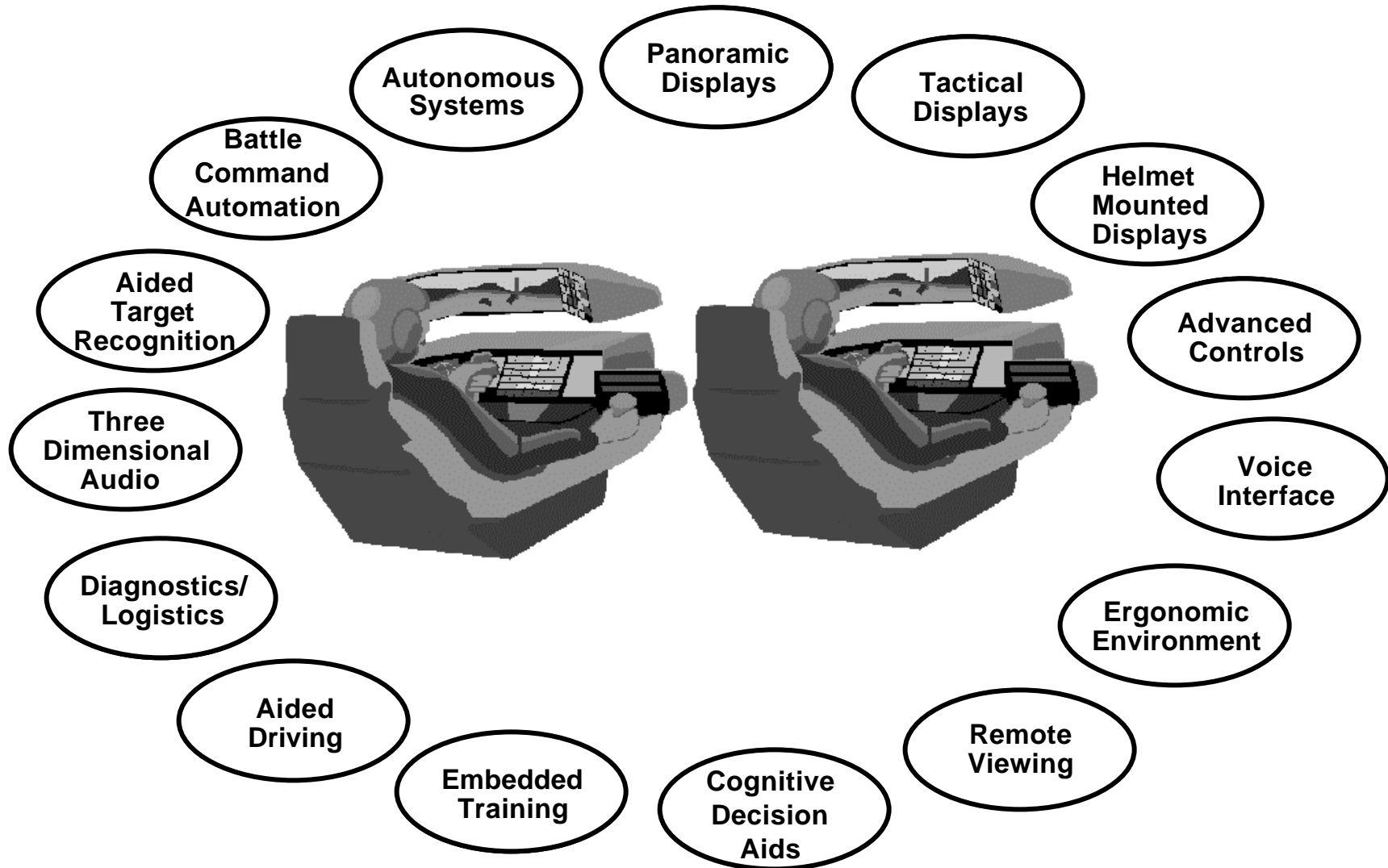
# Crewman's Associate ATD

- 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



# Vision

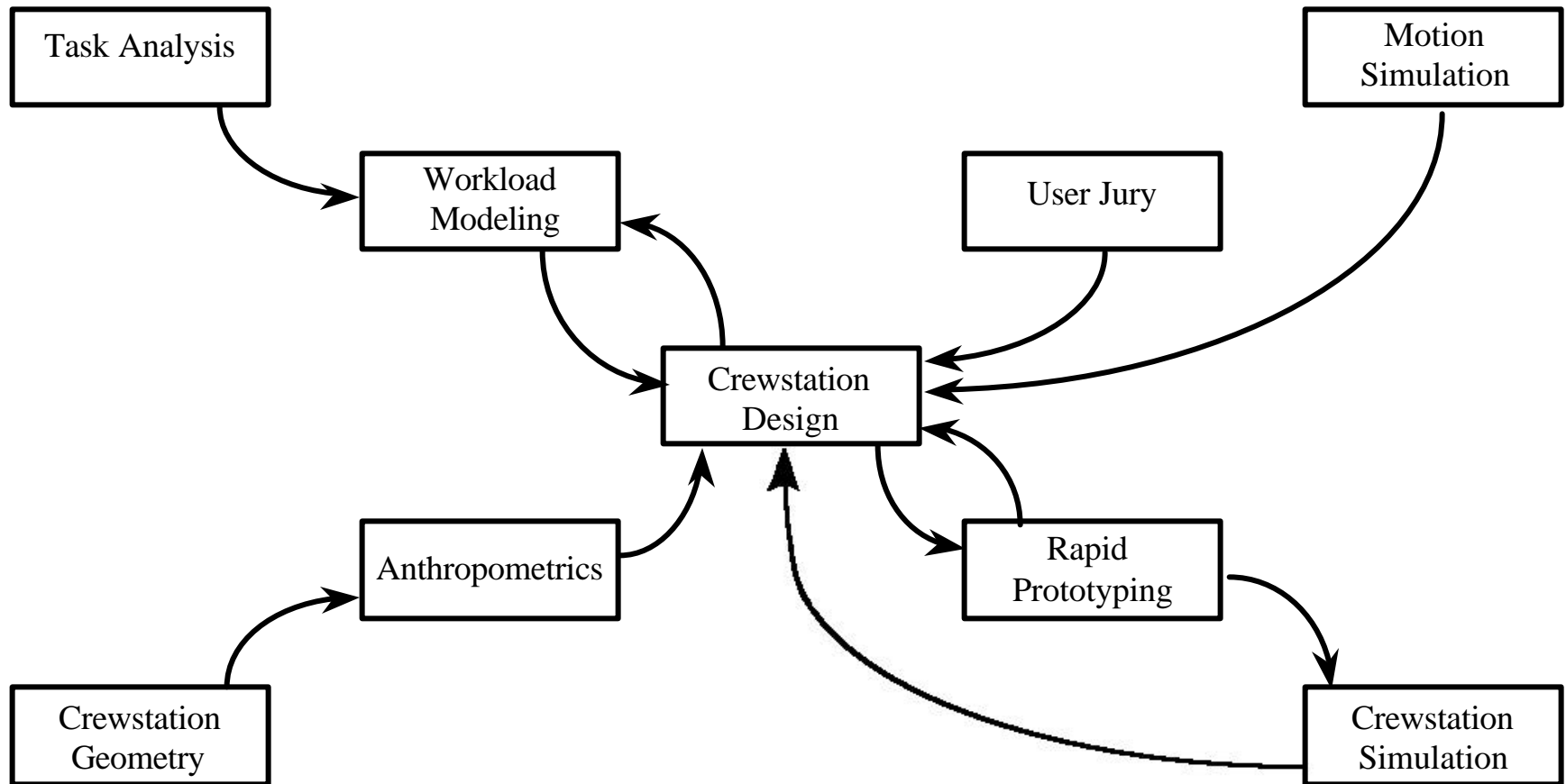


# *Objectives*

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*

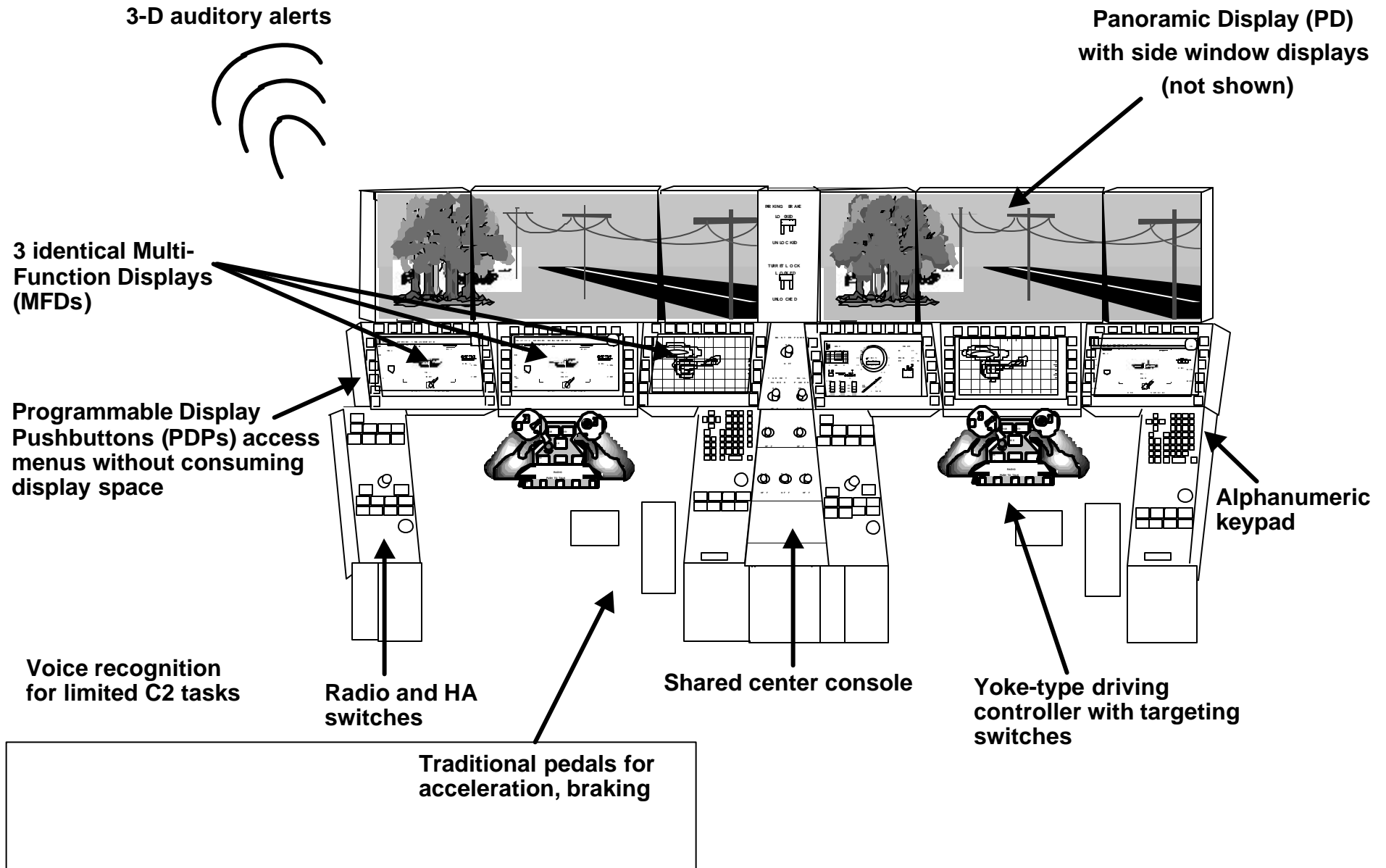


*Individual Steps or Complete Design Process Performed to Meet Project Goals*

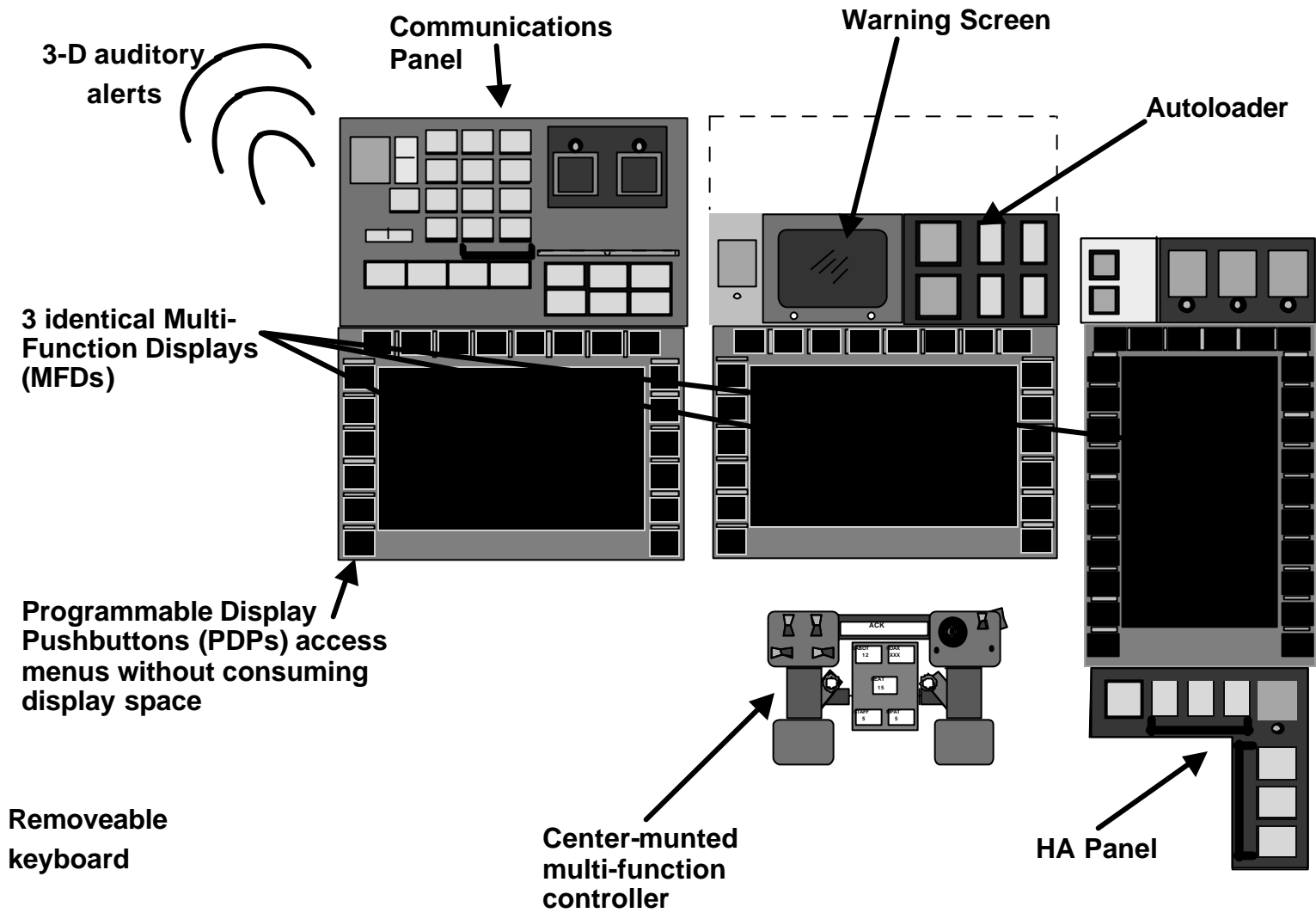
# Crewstation Design Principles (Primary)

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

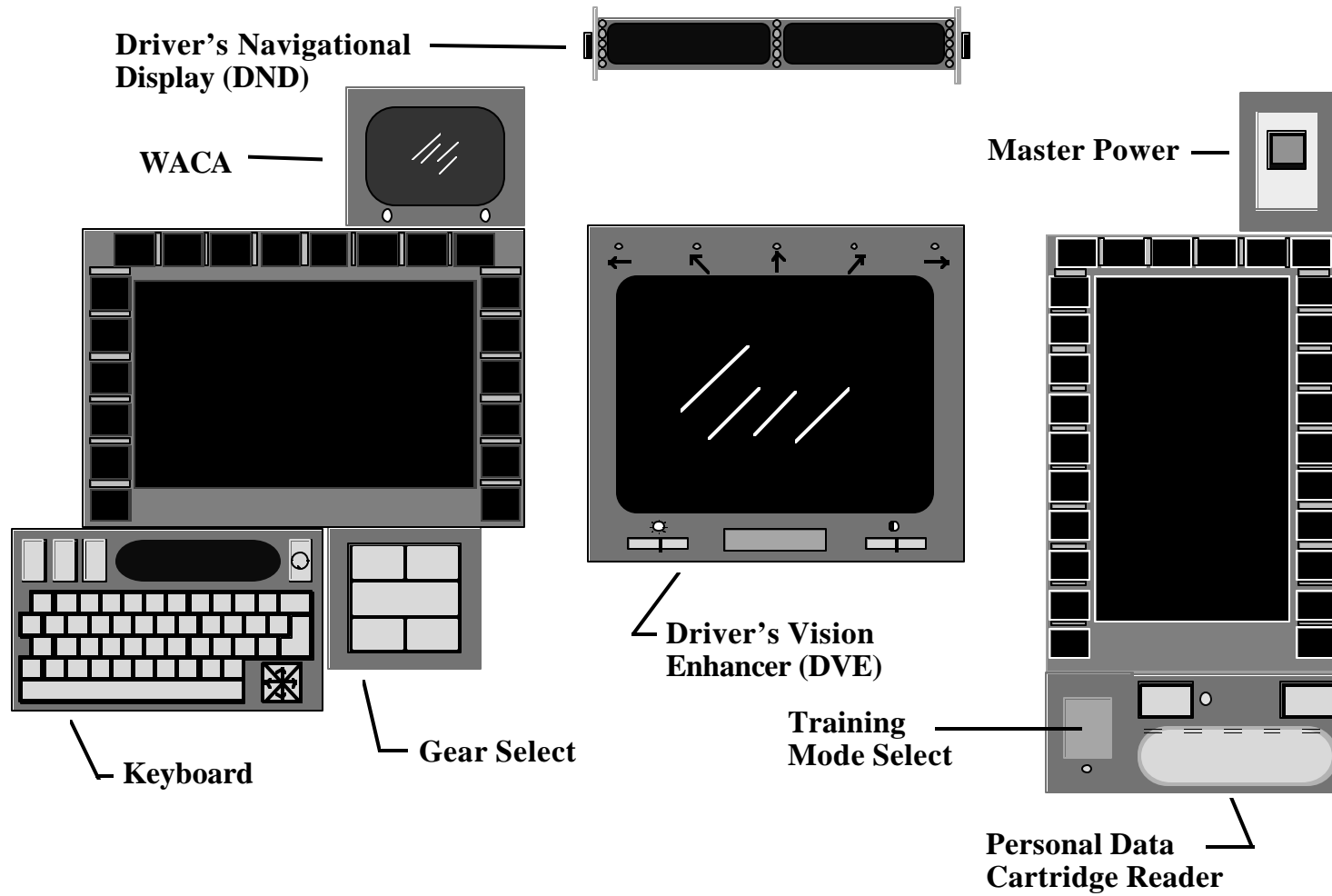
# 2005 Crewstation



# 1998 Crewstation



# *1998 Driving Station*



# Crewstation Displays

## Panoramic Display

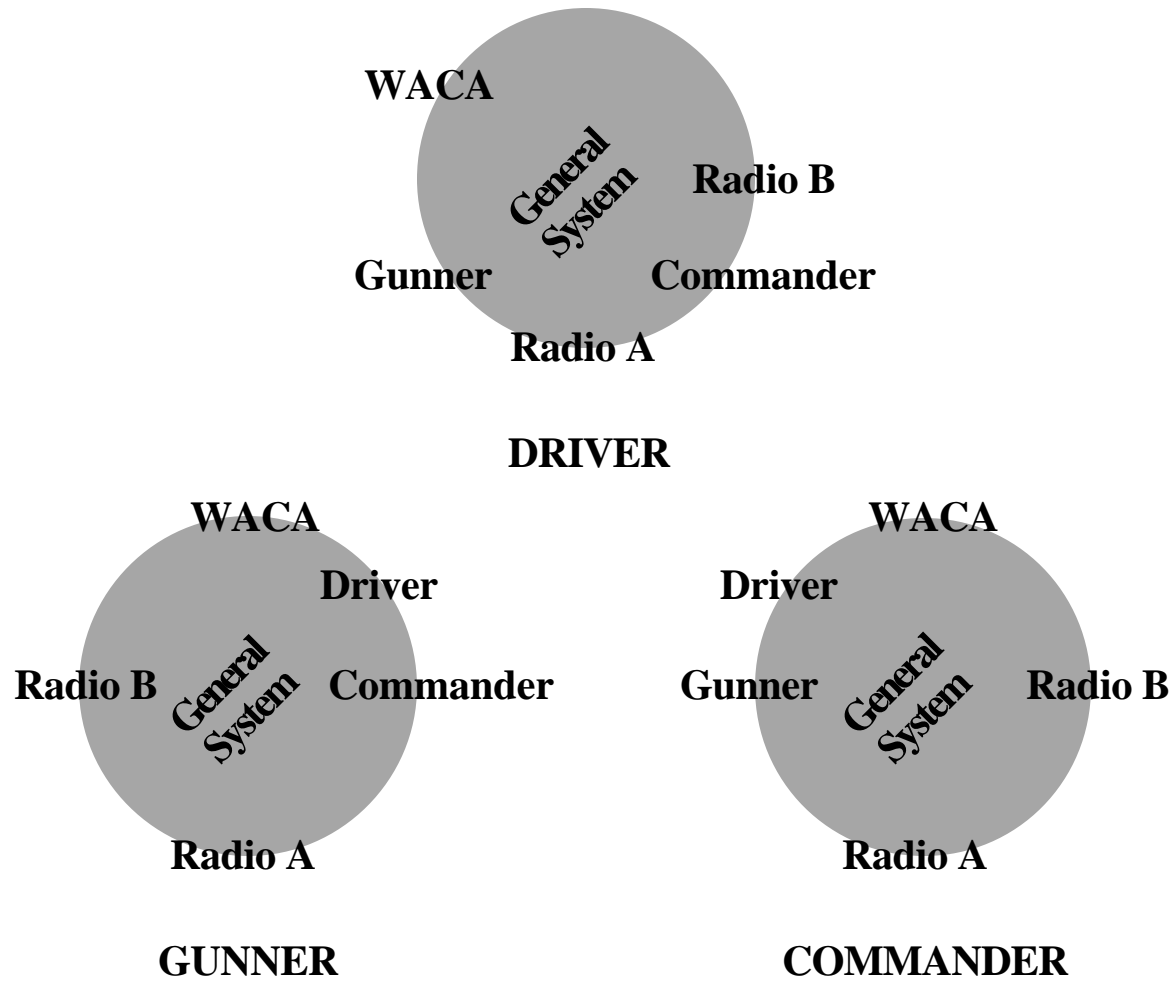
- 180 degree indirect vision to the crew
- Inherent protection from directed energy weapons
- Seamless, closed hatch vision
- Common visual environment
- Located within the Primary Vision Zone.

# 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*

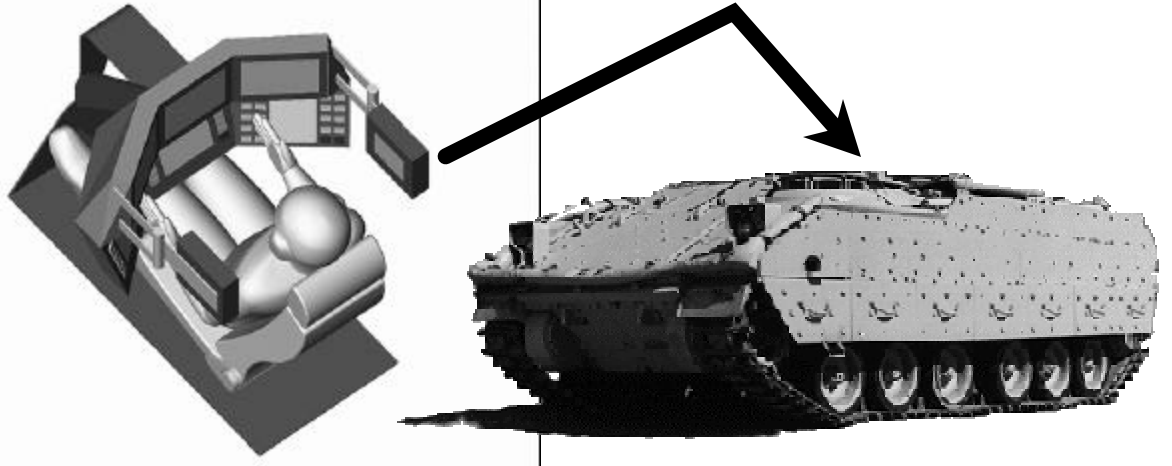
# Vetronics Technology Testbed (VTT)

- **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

