



# **M1A2 SEP Tank Embedded Training Technology**

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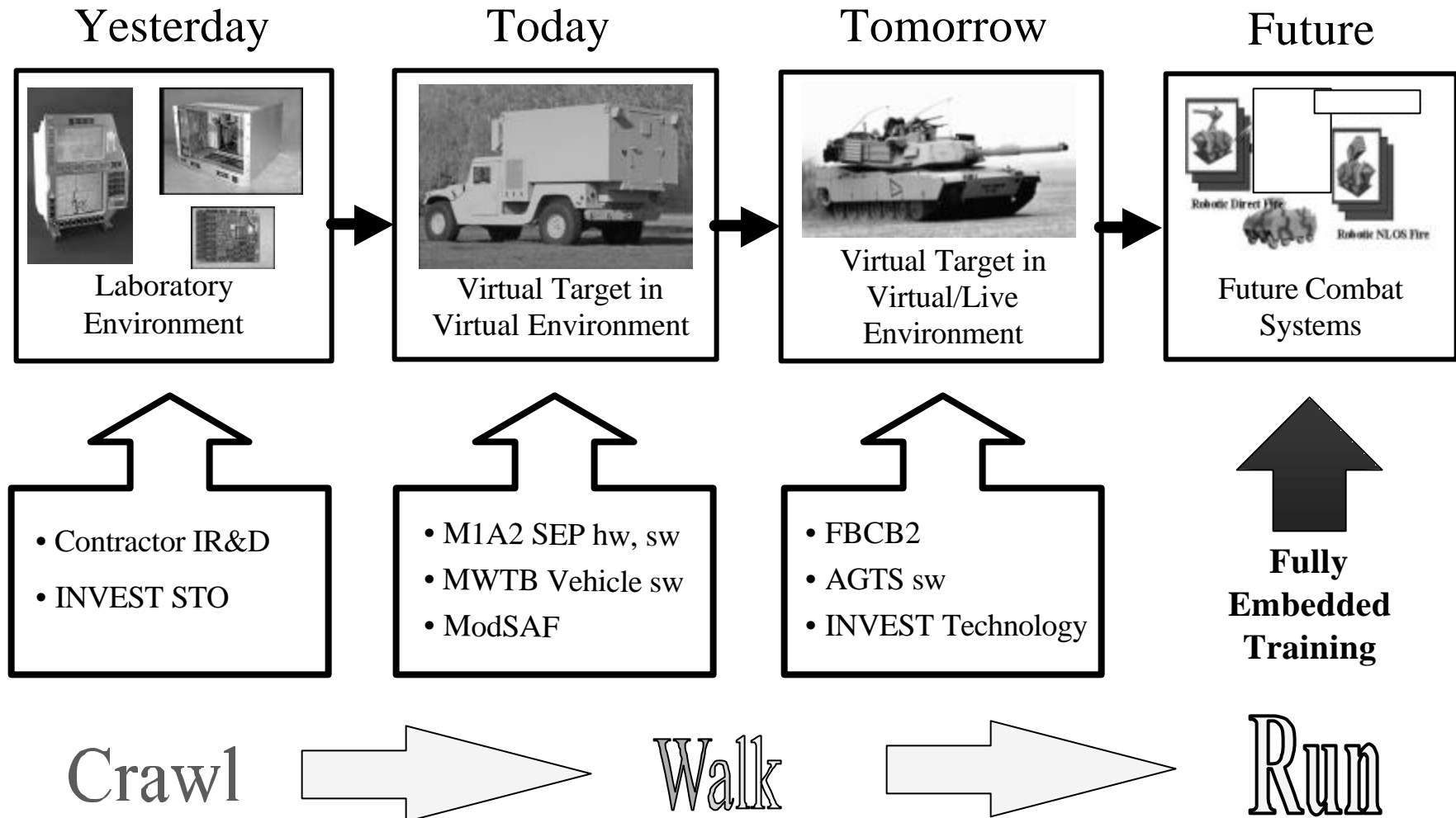
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# Laboratory Based Research & Development



**Yesterday**

# Reconfigurable Test Platform



## Mobile Laboratory

- **Utilized for Vehicle-on-the-Move Testing**
- **AM General M1097A2 HMMWV with a Military Shelter**
  - 15KW Generator
  - 24,000 BTU ECU





# Mobile Crew Station Simulation Laboratory (MCSSL)



Facilitates M1A2 SEP Tank Embedded Training Technology Implementation

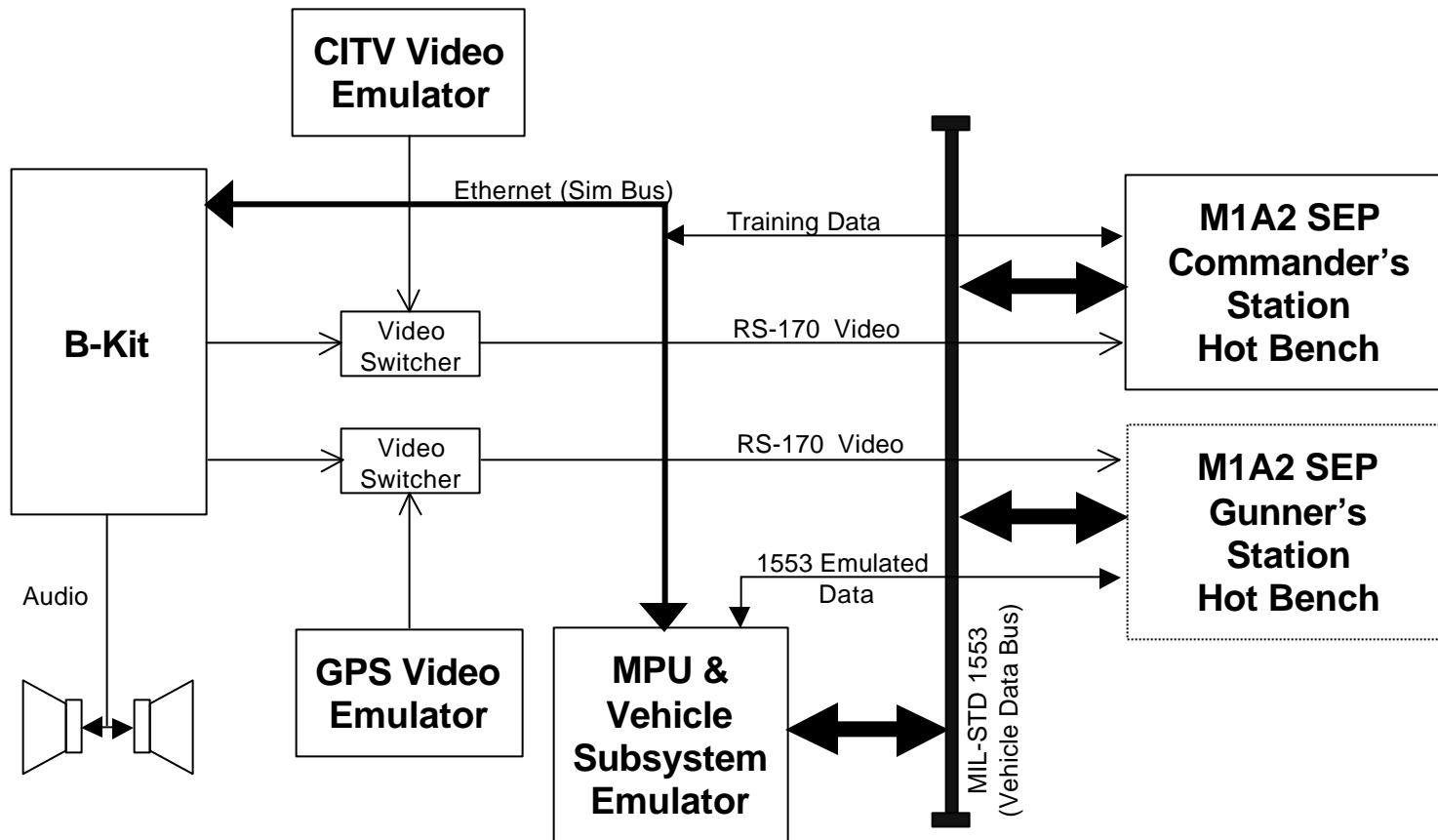
- Incorporates M1A2 SEP Tank LRUs or Commercial Equivalents
- Utilizes M1A2 SEP Tank Software
- Pre-platform Integration Risk Reduction

**Today**

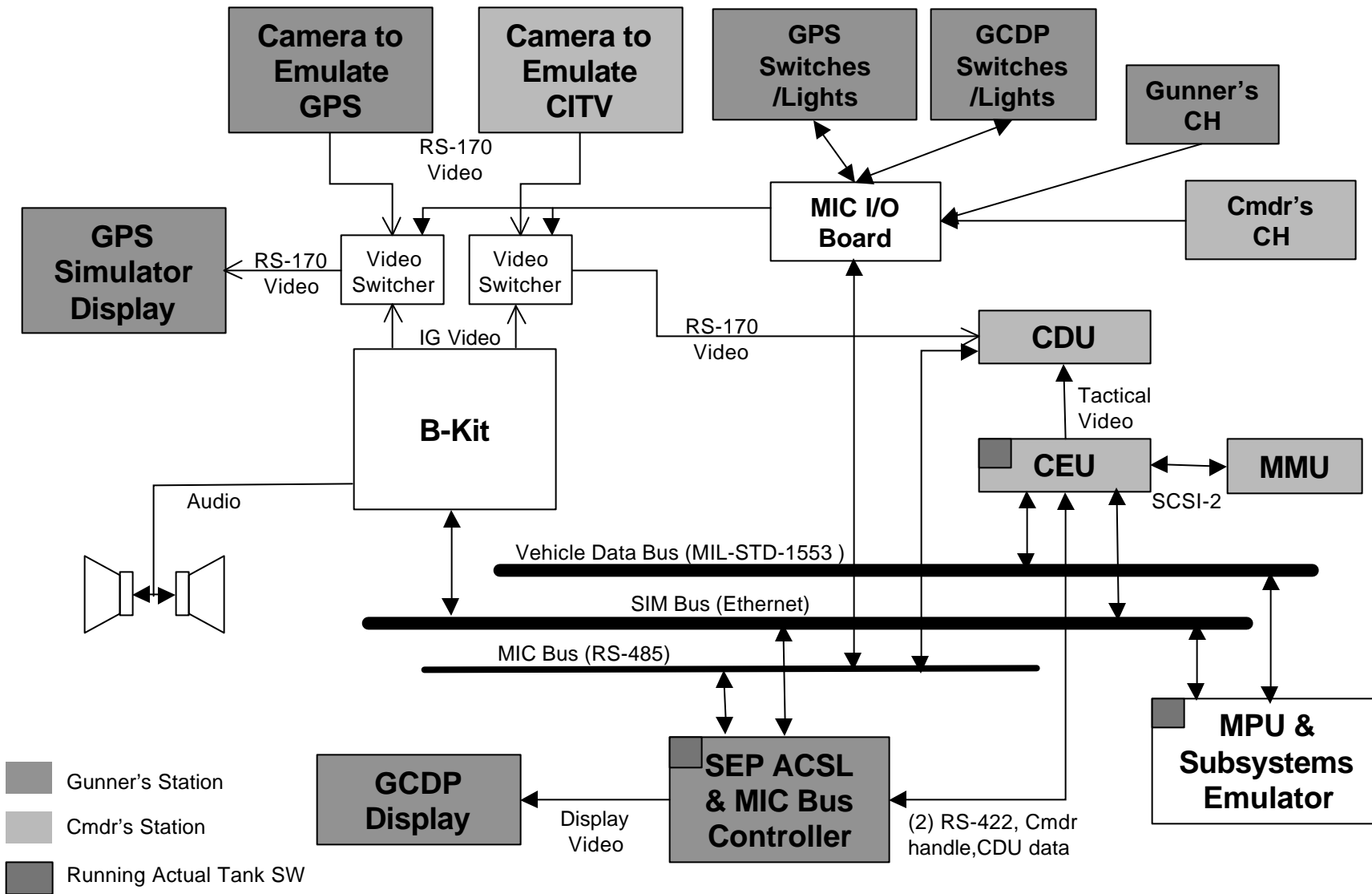


Cost Effective • Reconfigurable • Mobile

# MCSSL Top Level Functional Diagram

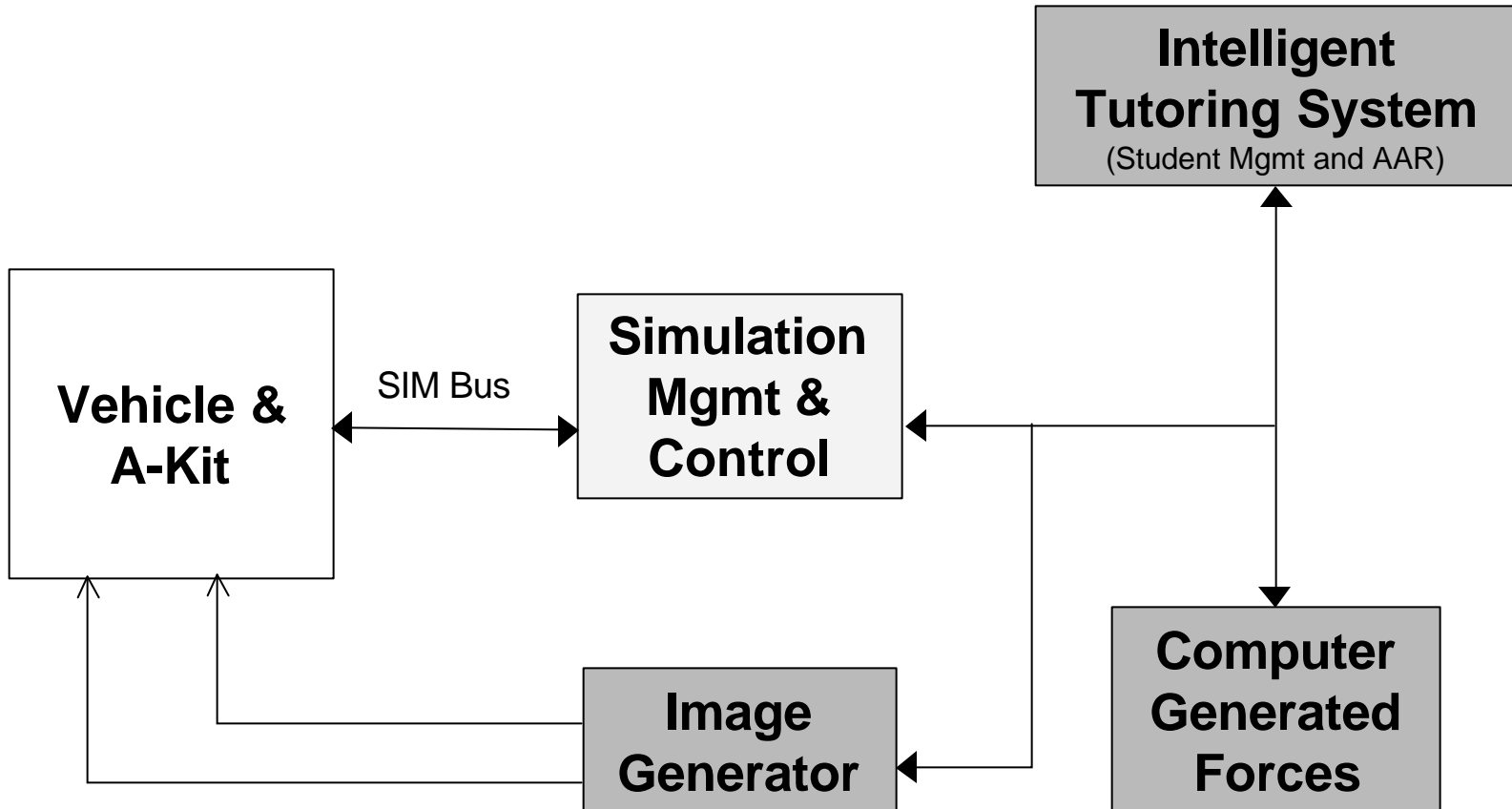


# MCSSL Detail Architecture Diagram





# B-Kit Architecture Diagram





# M1A2 SEP Tank



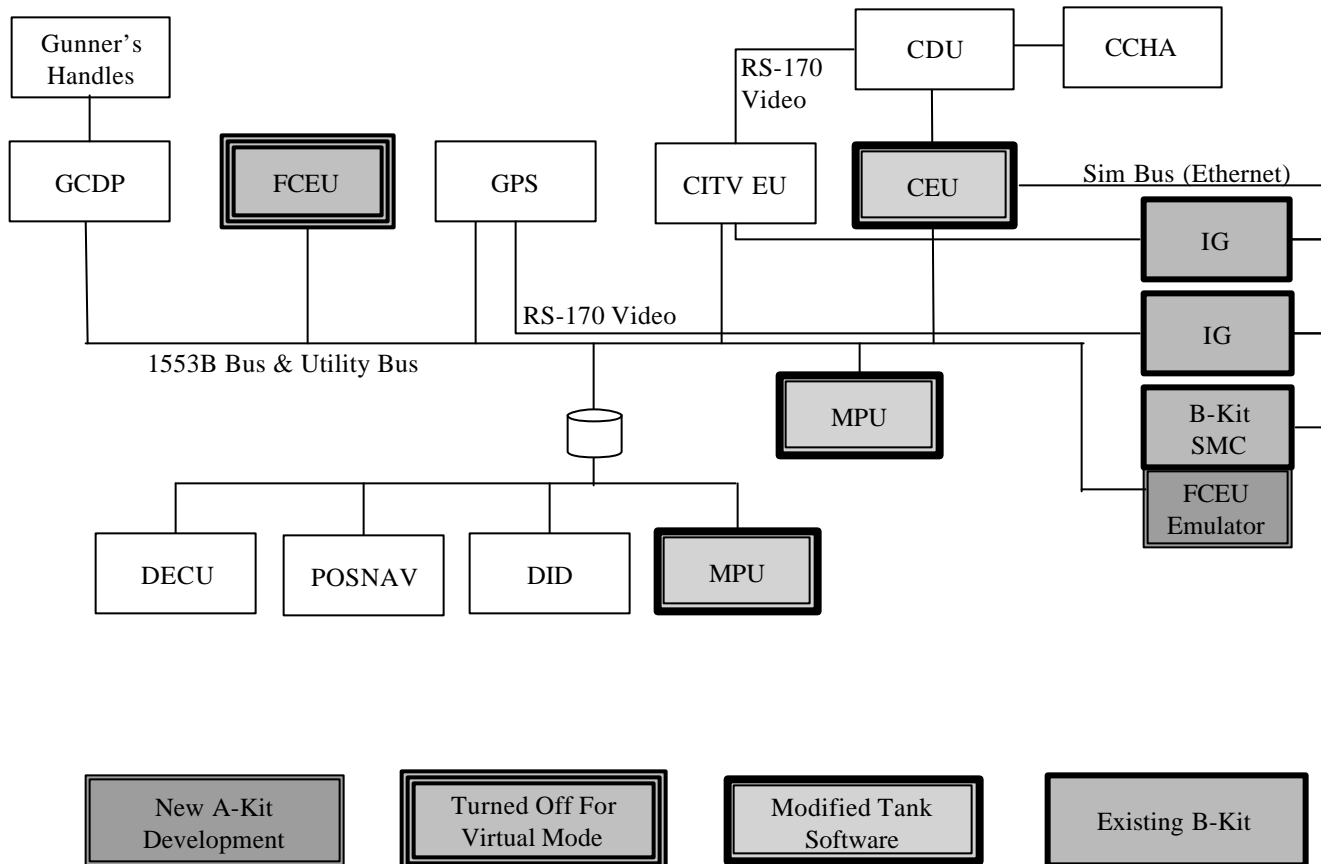


# M1A2 SEP Tank - Embedded Training Demonstrations

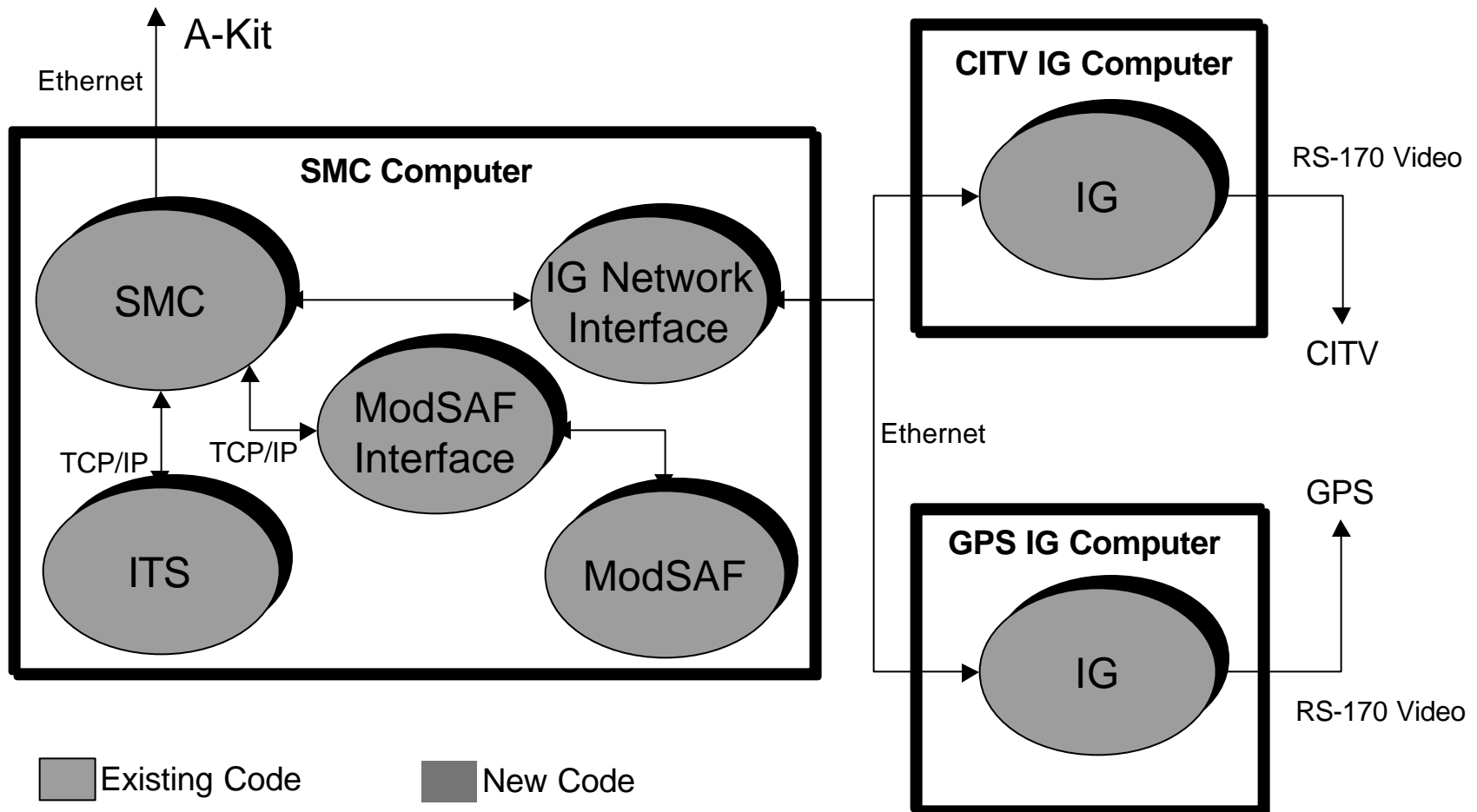


General Capabilities	Objective Demo	Initial Demo AUSA
Full Virtual Environment	X	X
After Action Review	X	No
AGTS Software Integration	X	No
Distributed Interactive Simulation (DIS)	X	Limited
<b>Gunner Station Capabilities</b>		
Gunner's Primary Sight (GPS)	X	Limited
Gunner's Control Display Panel (GCDP)	X	X
Gunner's Control Handle	X	X
<b>Commander Station Capabilities</b>		
Commander's Independent Thermal Viewer (CITV) Sight	X	X
Command & Control (including FBCB2)	X	No
Integrated Training Menus on CDU	X	X
Commander's Control Handle	X	X
<b>Hardware Features</b>		
Ruggedized Embedded Training LRUs	X	X
A-Kit for M1A2 SEP Tank	X	Limited

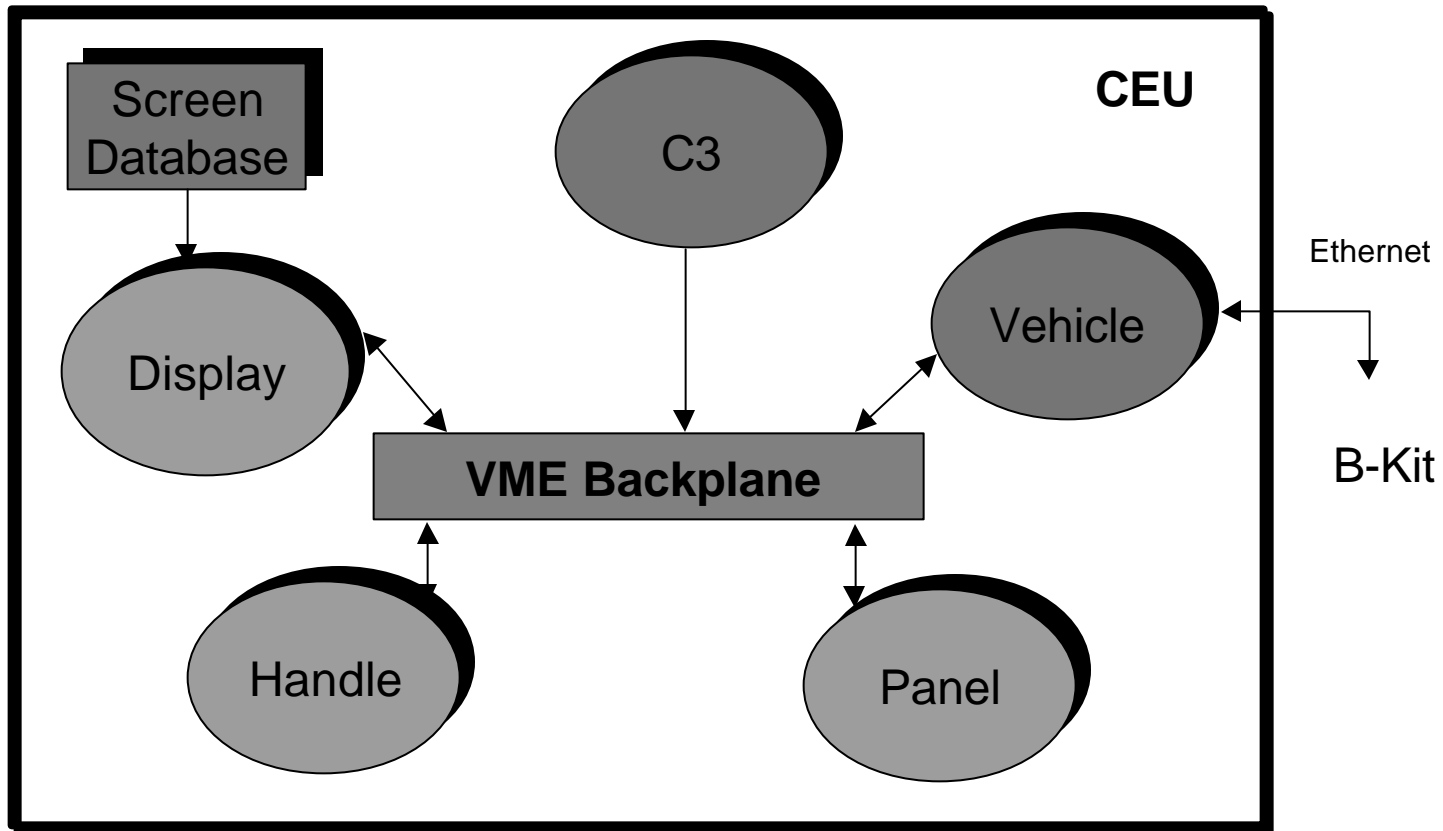
# M1A2 SEP Tank Embedded Training System Architecture



# B-Kit Architecture

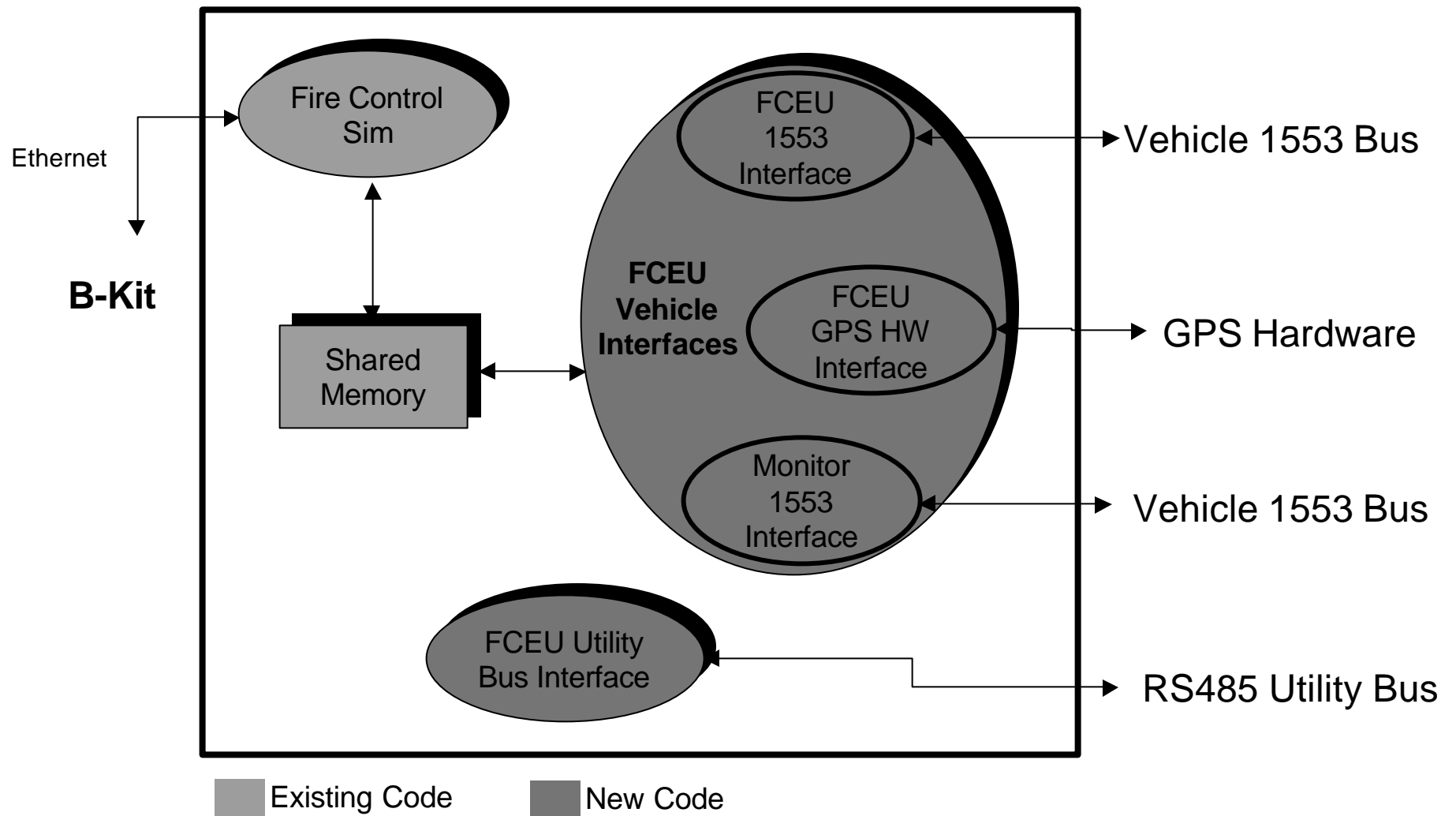


# Commander's Electronic Unit (CEU) Architecture

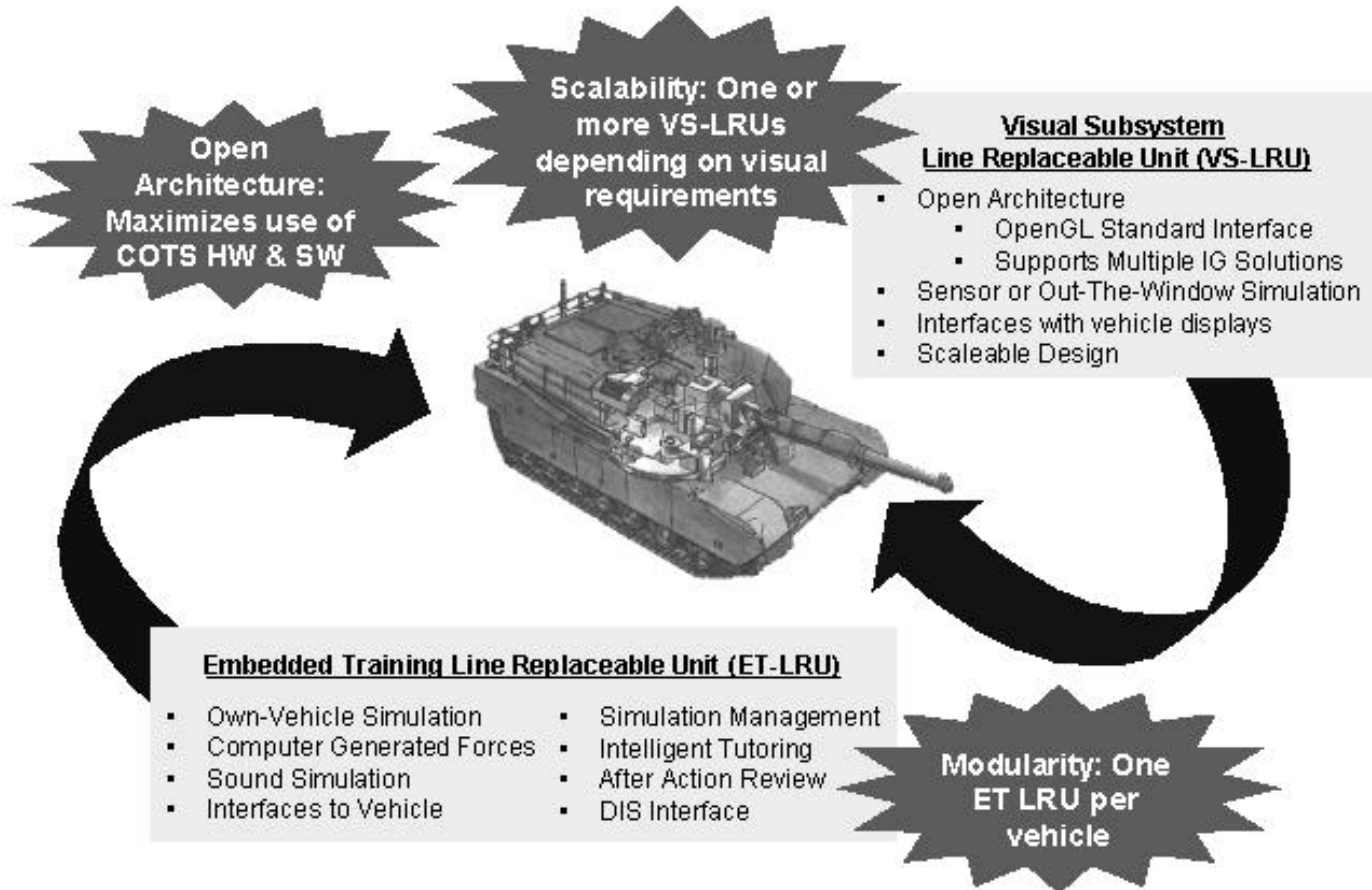


Unmodified
  Modified

# FCEU Emulator Architecture



# Technical Approach - Building Block Solution



**A building block approach using an ET-LRU and multiple VS-LRUs allows for maximum flexibility and cost effectiveness**



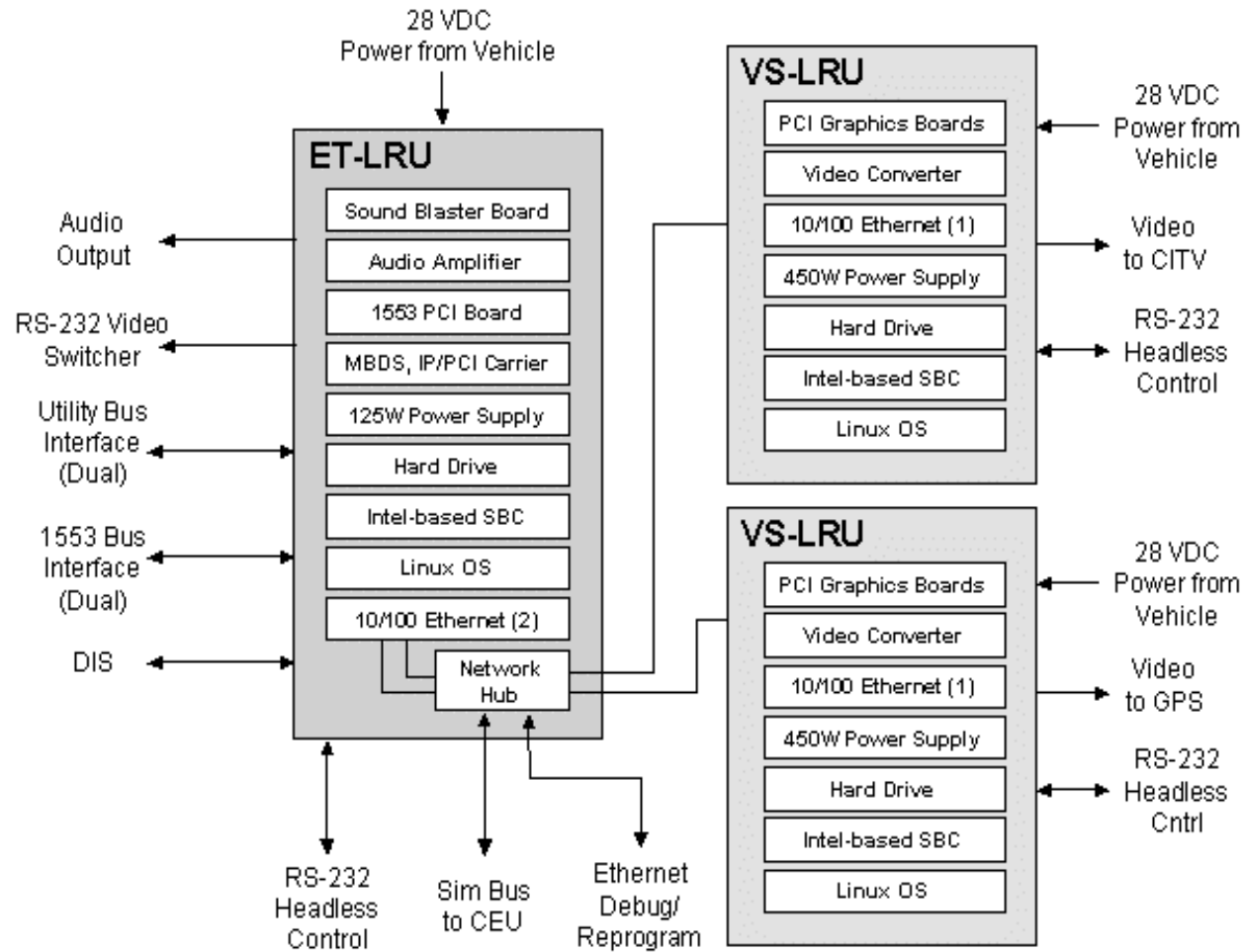


# Building Block Approach Advantages

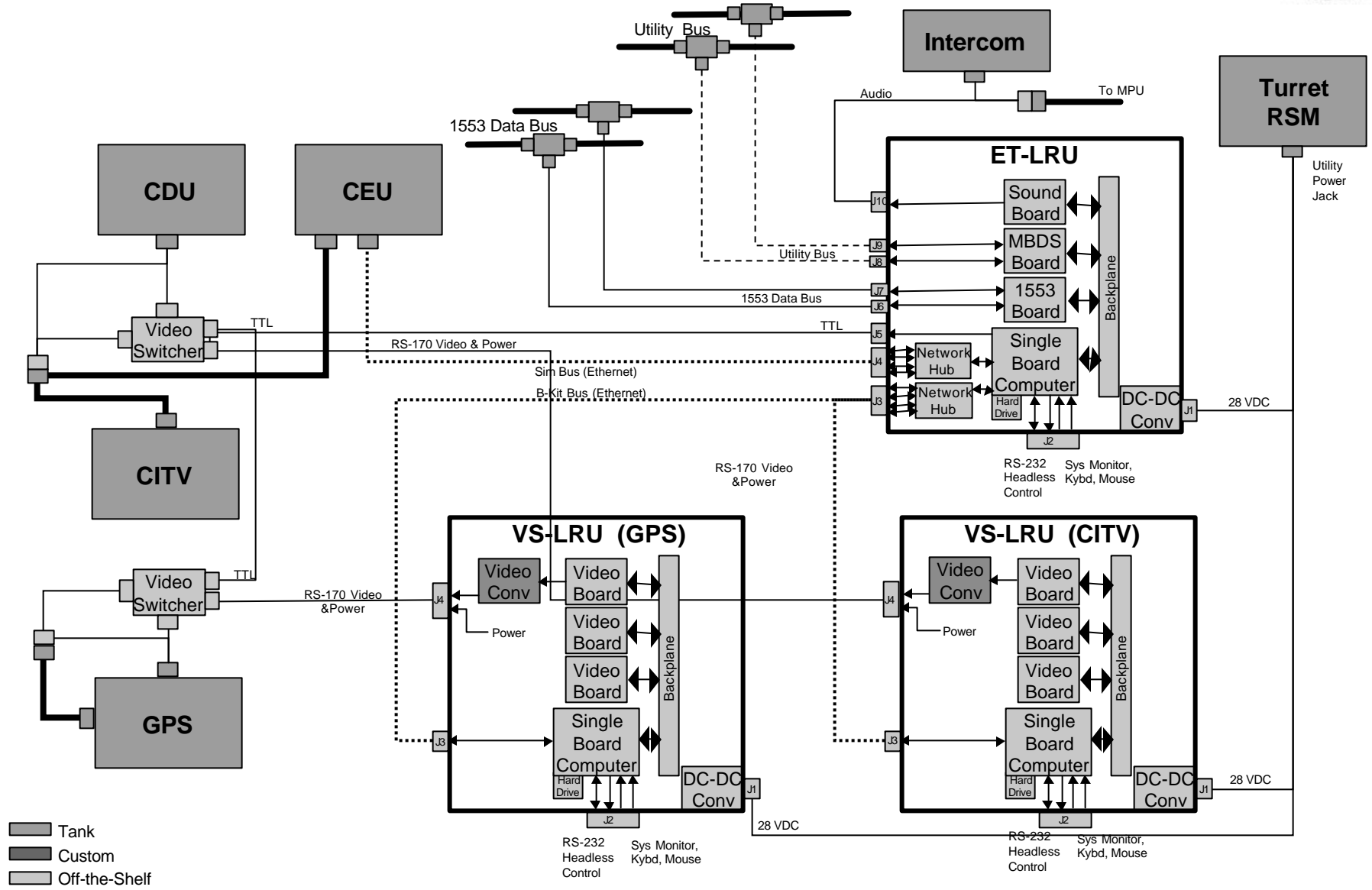


<b>Attribute</b>	<b>Advantages</b>
<b>Placement</b>	<b>Placement of multiple small boxes will be easier to achieve within the tight confines of the legacy ground combat vehicle.</b>
<b>Environmental</b>	<b>Distribution of the heat loads assists in heat load management.</b>
<b>Power Management</b>	<b>Distribution of the power loads assists in power management.</b>
<b>Scalability</b>	<b>Additional capabilities (e.g., adding the driver) can be achieved by adding a VS-LRU in the driver's area.</b>
<b>Modularity</b>	<b>System modularity is achieved by logical distribution of software and hardware functions allowing changes in subsystem configuration without impacting the entire architecture.</b>
<b>Graceful Degradation</b>	<b>Failure of a single VS-LRU does not imply total system failure.</b>

# ET & VS LRUs – Maximum Use of Common COTS SRUs

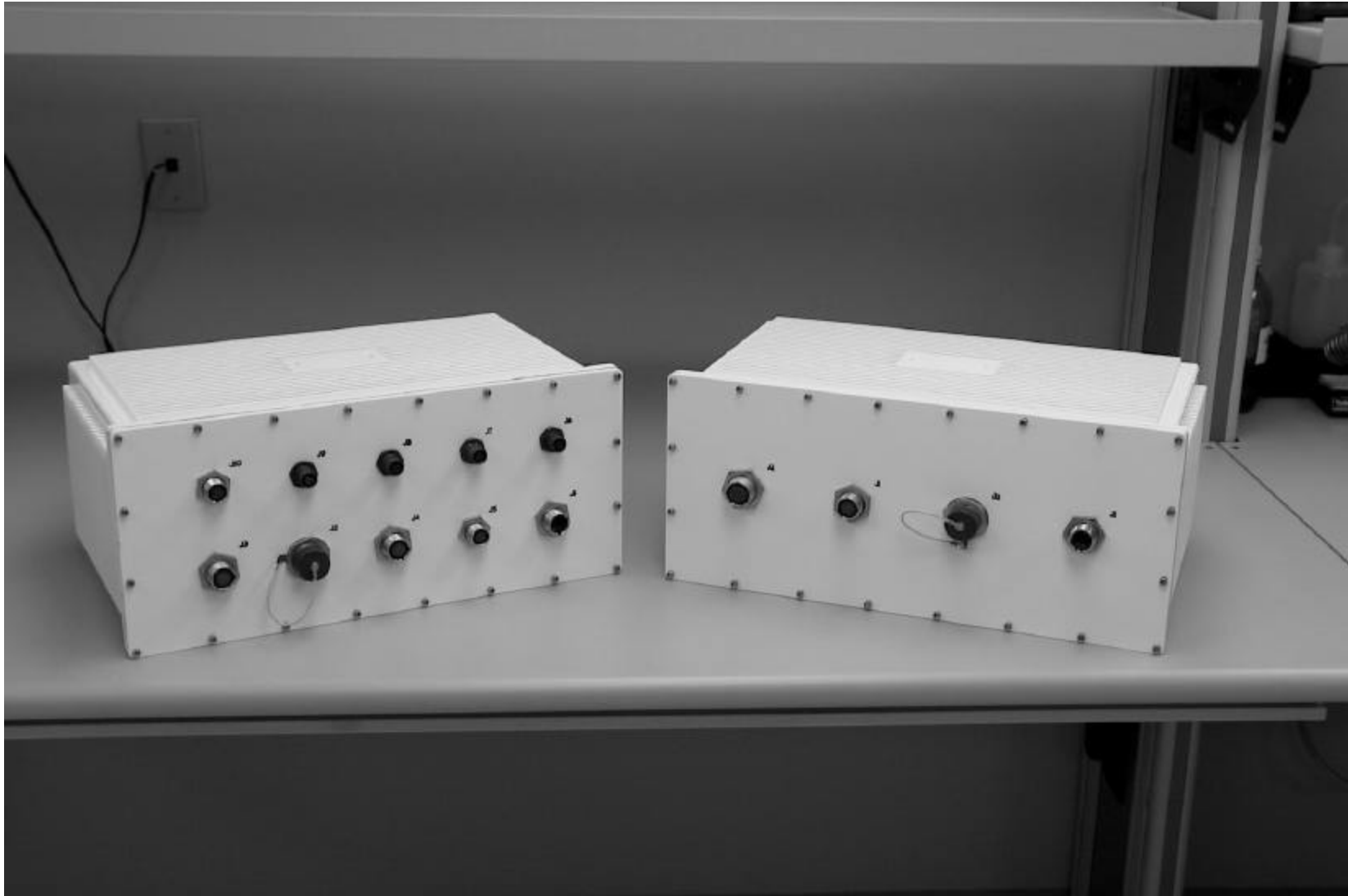


# AUSA Demo Hardware Architecture



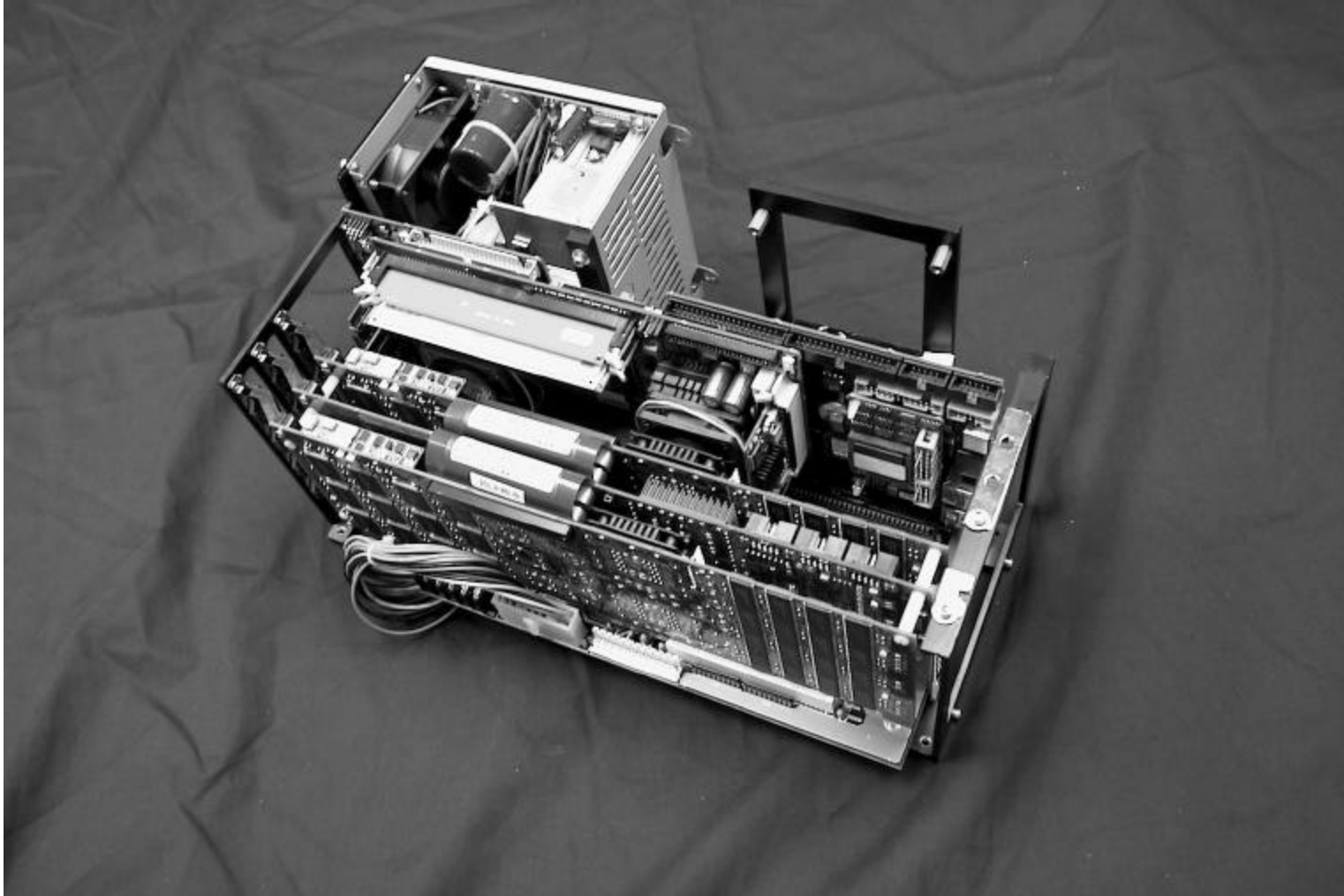


# AUSA Demo Prototype LRUs

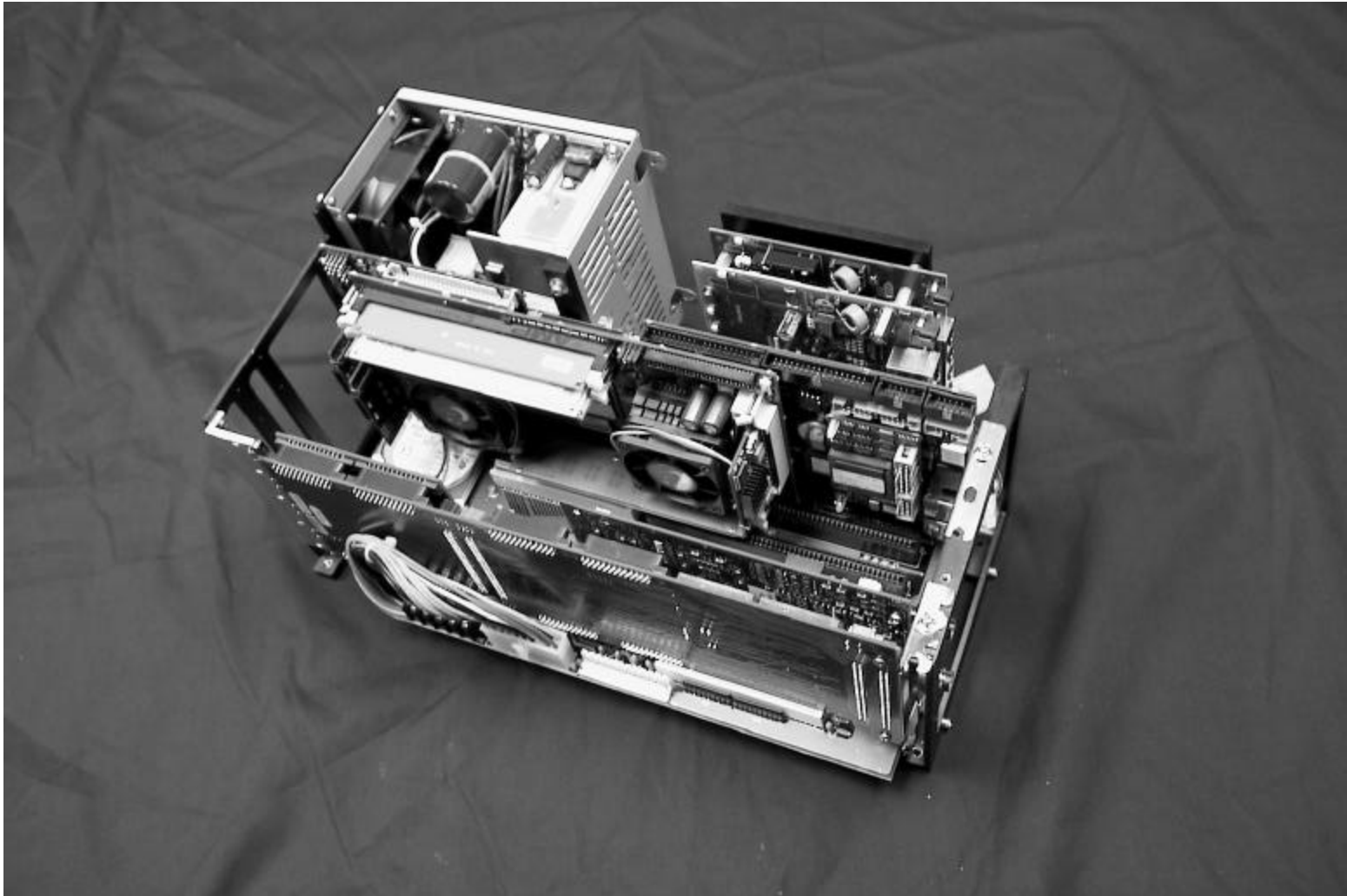




# Visual Subsystem (VS) Prototype LRU



# Embedded Training (ET) Prototype LRU



# M1A2 SEP Tank Embedded Training Technology



M1A2 SEP Tank Block Upgrade  
FY 03/04



Requirements

Technology Transfer



MCSSL (ET R&D)

- Design & Documentation
- A/B-Kit Development

- Precision Gunnery
- Full Crew Training
- Mission Planning/Rehearsal
  - Mobility Training
- Section/Platoon Gunnery
- Combined Arms Training

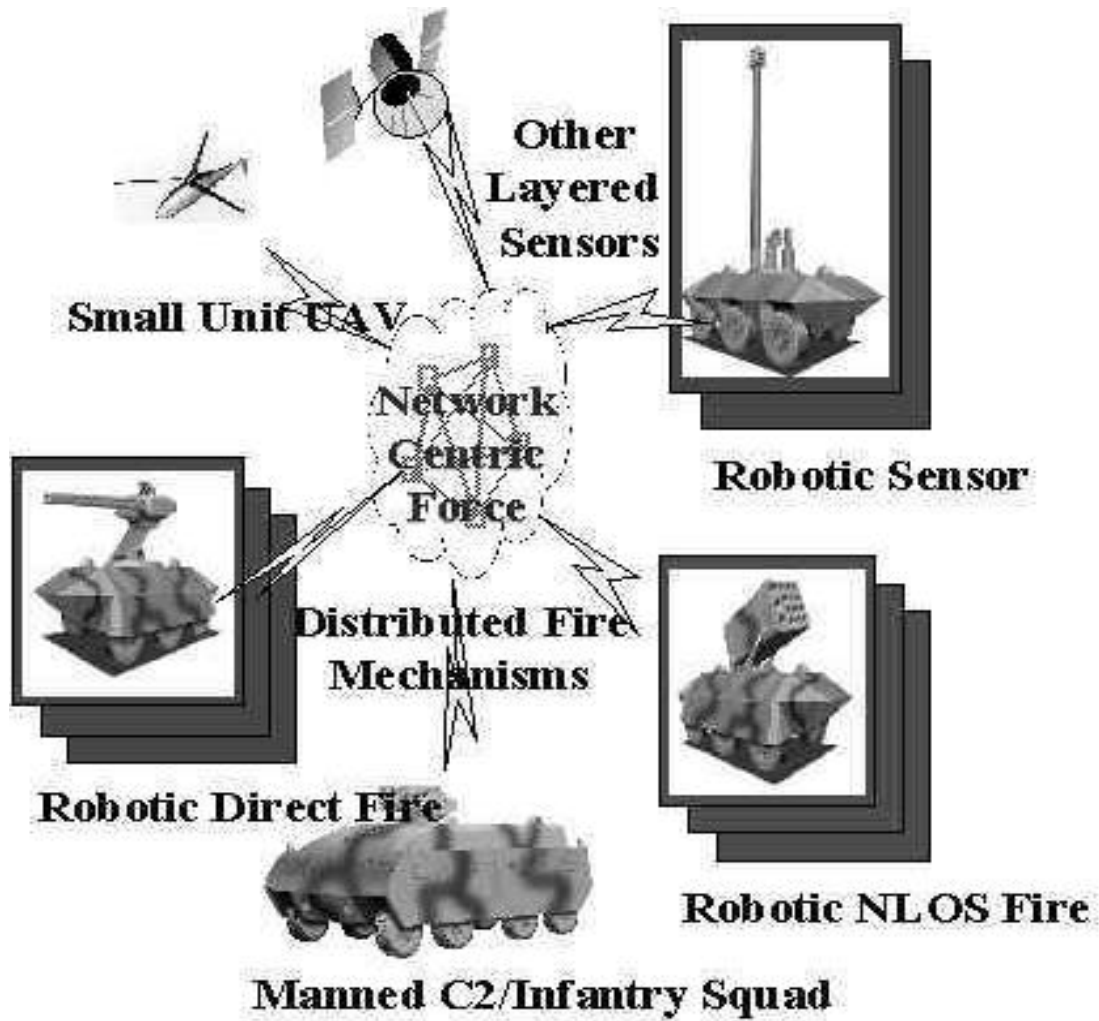


# Embedded Training Technology Challenges

- **Medium Risk Technology Challenges**
  - Hardware Miniaturization, Ruggedization, Heat Management
  - Secure High Bandwidth Inter-vehicular Communication
  - Real-time Database Development & Deployment
- **High Risk Technology Challenges**
  - Virtual Image Insertion into Live Imagery
  - Synchronized Semi-Auto Forces



# Future Combat Systems



**Future**

**Embedded Training**