

# BATTLEFIELD AWARENESS UNDERSTANDING THE FULL REQUIREMENT

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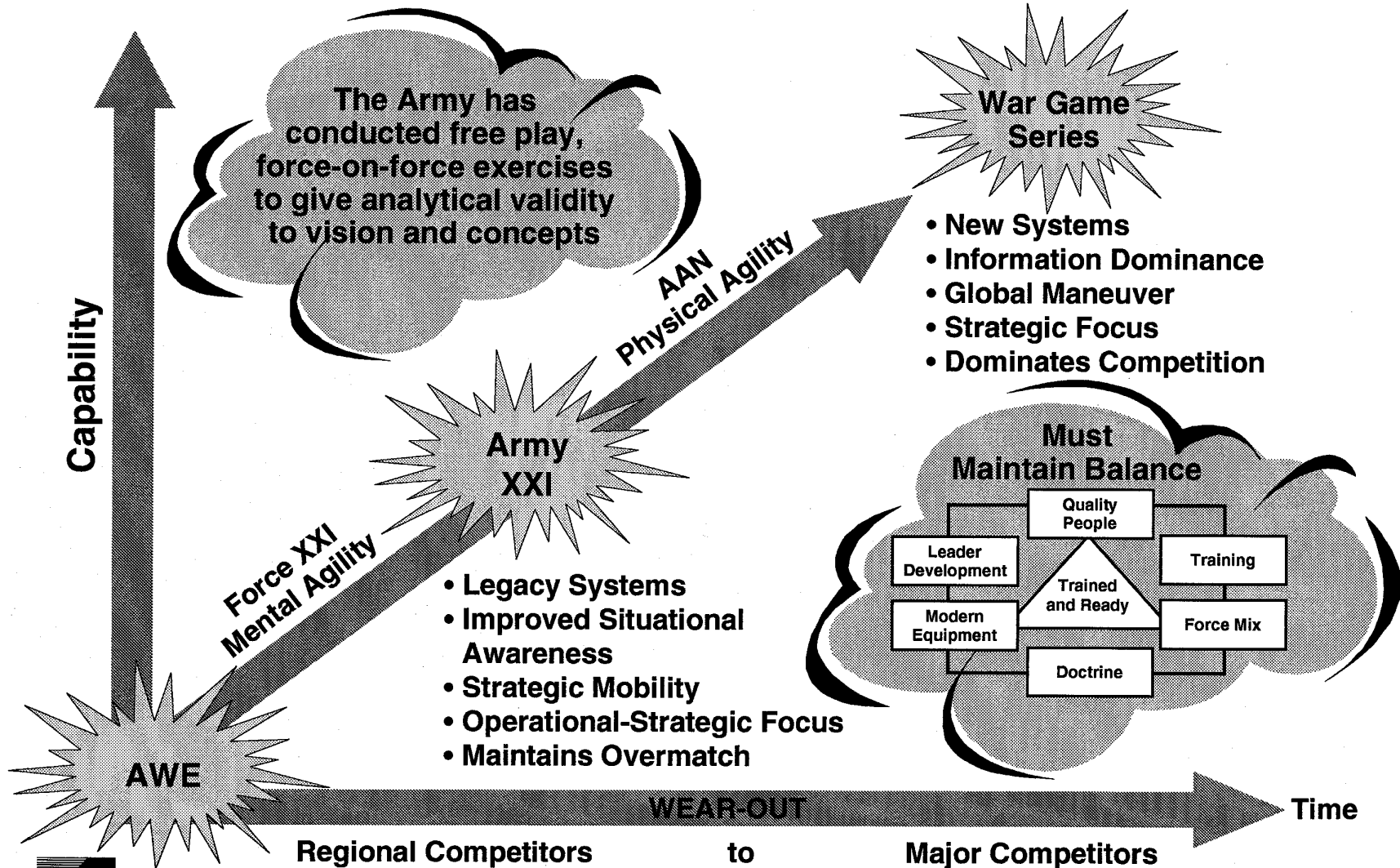
# *U.S. Army Requirements Process*

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- The U.S. Army has a Concept-Based Requirements System (CBRS) in which the intellectual process of developing an underpinning operational concept precedes the physical process of developing new systems. This intellectual process ensures you understand what you need and how it fits within your overall operational or warfighting schema. It addresses the following key factors:

**D** – Doctrine  
**T** – Training  
**L** – Leader Development  
**O** – Organizational Implications  
**M** – Materiel  
**S** – Soldiers

*The Path to AAN Begins with the Advanced Warfighting Experiments and Passes through Army XXI*



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## *Goal of Force XXI*

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- To enable the US Army to advance into the 21st Century as a land combat force that is more lethal and survivable and can control the operations tempo in any future conflict through enhanced Battle Command and information dominance. It is capable of:
  - Simultaneous planning and execution of multiple operations;
  - Always maintaining the initiative; and
  - Forcing the enemy to operate from significant disadvantage or quit

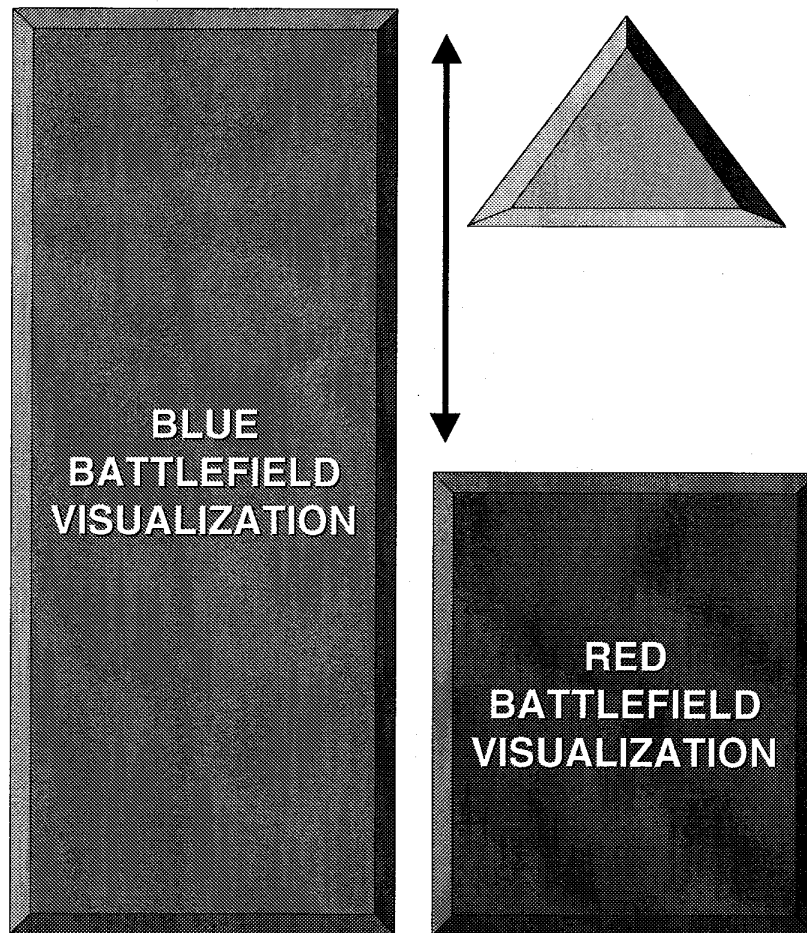
## *Mental Agility*

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*“The ability to leverage information dominance and enhanced Battle Command to act and react significantly faster than your opponent based on a clear and current understanding of the battlespace and the enemy – to keep the enemy always at risk and preclude him from responding effectively.”*

Menoher, '98

# Information Dominance



## = Information Dominance

- The aggregate of Information Operations activities that create an **advantage**
- Not just in the **amount** of information but in the relative capacity for **Battlefield Visualization**
- The Commander's **understanding** of his **current state** in relation to the **enemy** and the **environment...** **and...**his ability to see these in the context of a **desired end state...** **and...**his ability to visualize the **sequence of activity** that will move his force from its current state to its desired end state



## *Battle Command*

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- The art of decision-making, leading and motivating soldiers and their organization into action to accomplish missions. *It includes visualizing the current state and desired future state, then formulating the concept of operation to get from one to the other at least cost.*

(FM 100-5, Jun 93, and TRADOC PAM 525-5, Aug 94)



# *Changing Nature of Battle Command*

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## BEFORE

- Vertical
- Hierarchical
- Sequential

## DIGITIZED

- Integrated
- Collaborative
- Concurrent/NRT





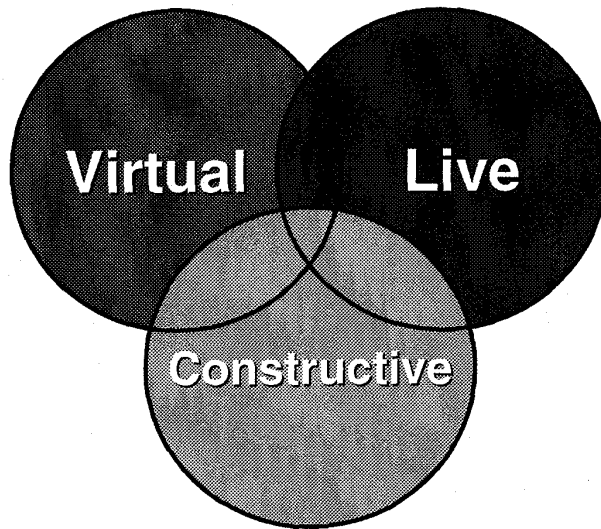
## *Battlefield Visualization*

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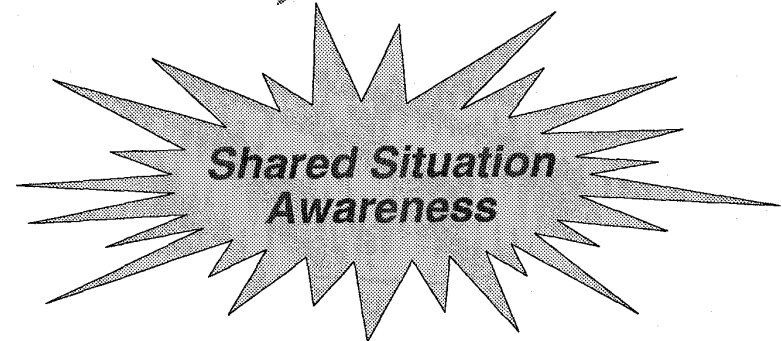
- “The process whereby the commander develops a clear understanding of his current state with relationship to the enemy and the environment, envisions a desired end state, and then subsequently visualizes the sequence of events that will move his force from the current state to the desired end state.”

(TRADOC PAM 525-70, Oct 95)

*Battlefield Visualization  
Our Objective*



*Today*



Drive Live, Virtual and Constructive environments into one coherent architecture for America's Army, using the Army Technical Architecture as our guide

*One system to train for, plan, wargame,  
rehearse, and execute operations*



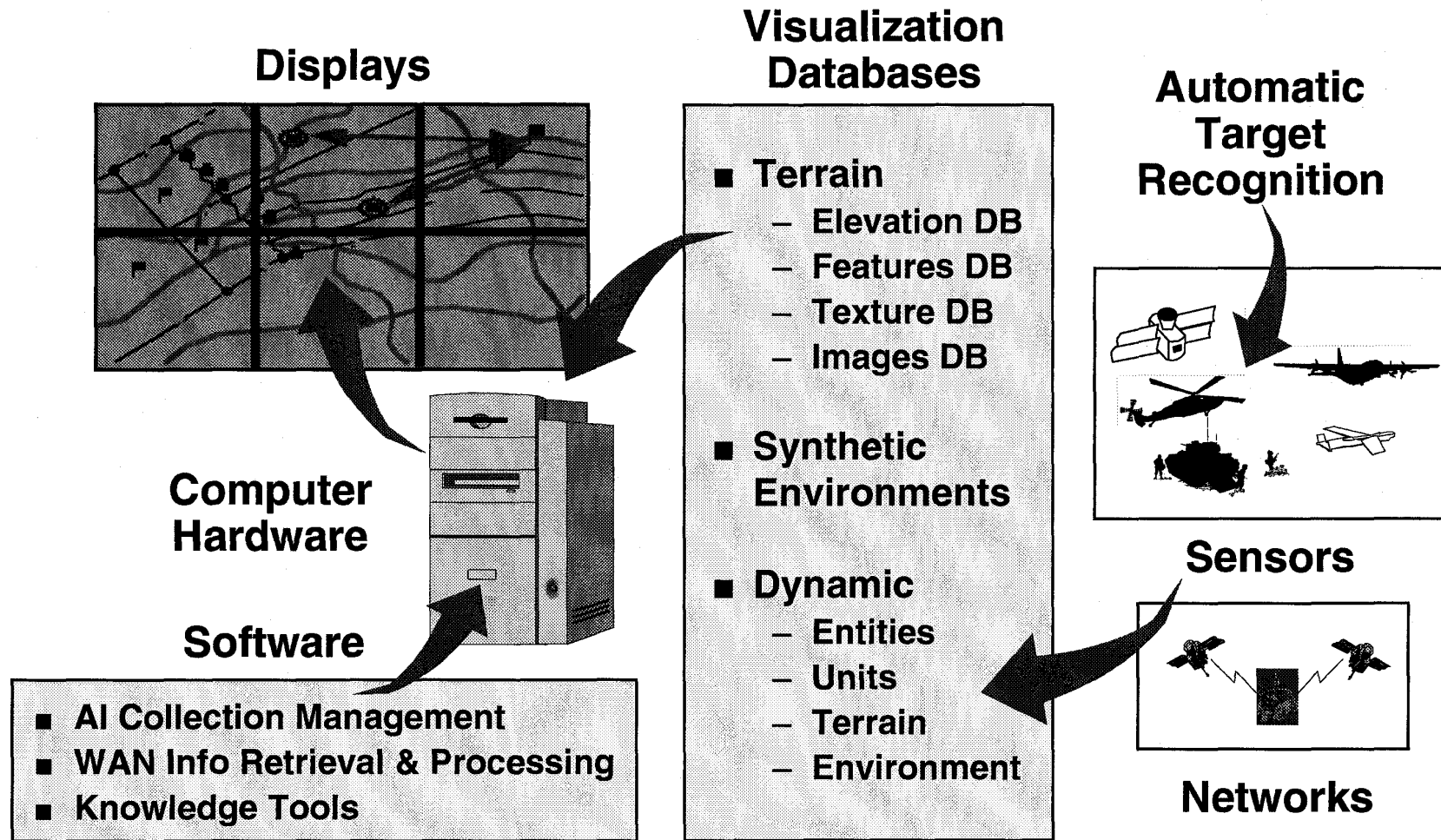


## *Major Issues*

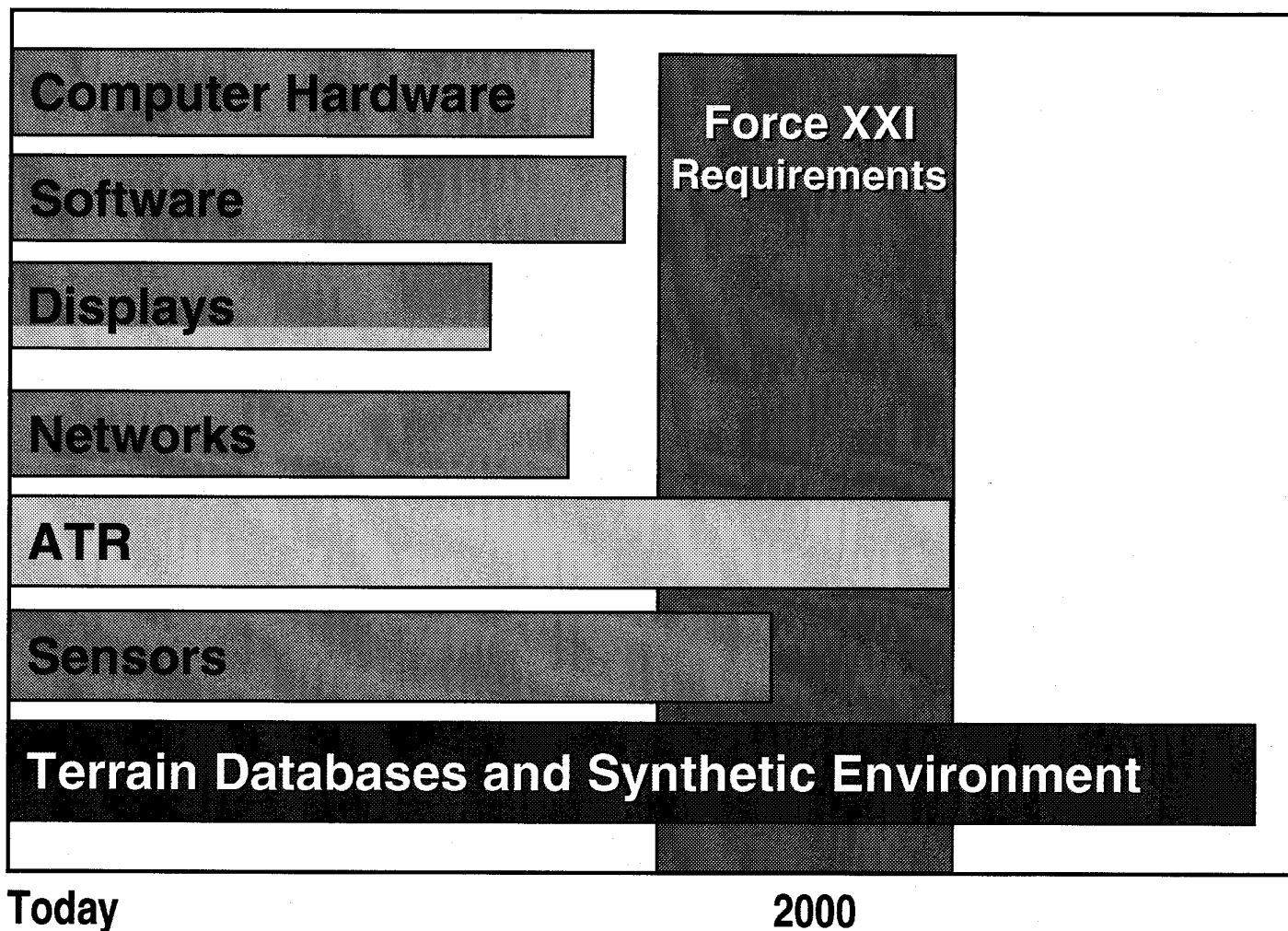
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- Requirement for high resolution DTED
- Interoperability and integration of non-, partially, and differently digitized units
- Leader development
- Perishable skills
- Requirement for synthetic training environments to develop, then maintain, requisite skill levels for leaders and operators

# Battlefield Visualization Enabling Technologies



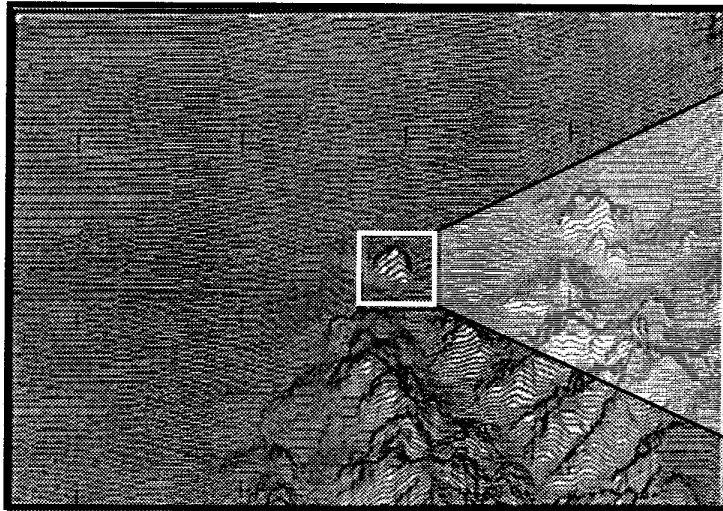
# *Technology Maturation Support to Battlefield Visualization*



# Digital Terrain Data

## Two Problems: Resolution & Coverage

DTED Level 1 (100 meter)



- **Planning-level data (world-wide)**  
Levels 1 (100m) and 2 (30m)

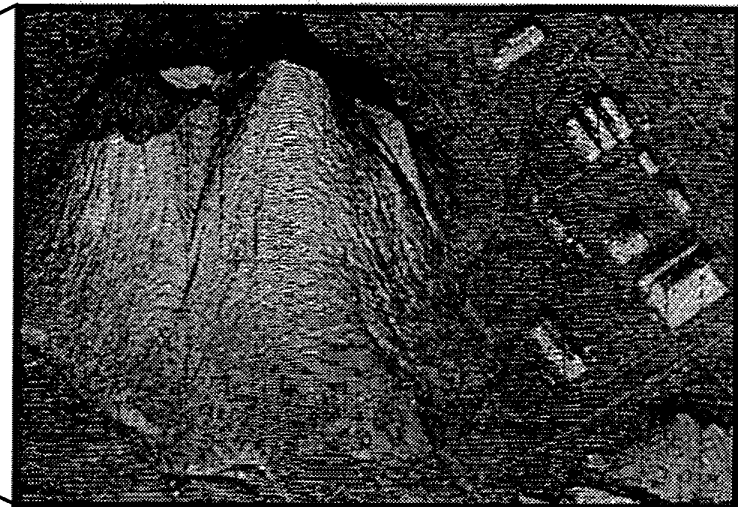


- **Coverage 66%**



- **< 3%**

DTED Level 4 (3 meter)











- **Operation-specific areas require higher resolution data**  
Levels 3 (10m), 4 (3m), and 5 (1m)



- **Virtually Nonexistent**

# Uses for Hi-Res DTED

FUNCTION	DTED 1	DTED 2	DTED 3	DTED 4	DTED 5
<ul style="list-style-type: none"> <li>• Planning</li> <li>• IPB</li> <li>• Msn Rehearsal               <ul style="list-style-type: none"> <li>– J/G-Staff</li> <li>– S-Staff</li> <li>– Air (Nap of the Earth)</li> <li>– Vehicle (2m obstacle)</li> <li>– Soldier (1m survivability)</li> </ul> </li> <li>• Targeting</li> </ul>					
					
					
					
					
					
					
					

**The lower the echelon, the higher the required resolution**

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## *Interoperability Issues*

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- Defense budgets and time will not permit fielding of digitized Battle Command and intelligence systems with the same level of technology to the entire force
- There will never be a steady state; change and evolution will be constant
- There will always be legacy systems
- There will always be units with the latest technology the Army can field (“Haves”) and units with varying degrees of less capable systems, if anything (“Have Nots”)



# *Challenge*

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- To find an affordable way to provide “Have Nots” with the minimum essential, interoperable, digitized Battle Command and intelligence systems to enable them to learn how to operate and leverage information age technology to achieve information dominance and mental agility



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# *Leader Development Challenge*

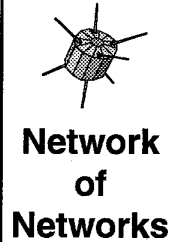
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- Leaders must understand what digitized systems can and cannot do and learn to trust them and the information they provide
- They must also learn how to exploit enhanced situational awareness to recognize battlefield conditions and dynamically synchronize their combat power to exploit opportunities
- They must maintain focus through their commander's intent and CCIR

*Meeting the Challenge*  
*Understanding Decision Implications in the Information Age*

**Organizations**

- Integration vice hierarchy
- Focus on functions vice organizational construct
- Teams vs. functional staffs
- Pervasive connectivity – vertical and horizontal
- Chaotic vice linear processes



**Network  
of  
Networks**

**Training and Doctrine**

- Dynamic change in decision processes – mission rehearsal
- Full access to data
- Training support to a broader perspective
- Dynamic collaborative decision making
- Profound change (e.g. IPB and TTP)

**Operational and  
Intelligence  
Environment**

**Operations**

- Speed enabled by knowledge
- Broadened perspectives on information operations
- Multidimensional operations
- Profound NRT knowledge based
- New set of force protection challenges
- Focused analysis at point of decision

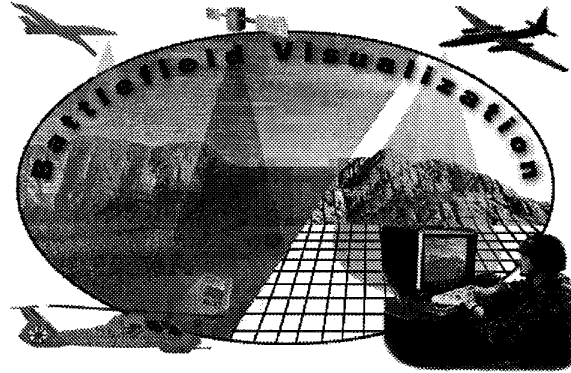
**Info Mgmt/Tech Development**

- Quality vs. quantity
- Accuracy and validation of knowledge
- Virtual headquarters seen as “real” entities
- “Machine-aided” decision...human confidence

# *Perishable Skills*

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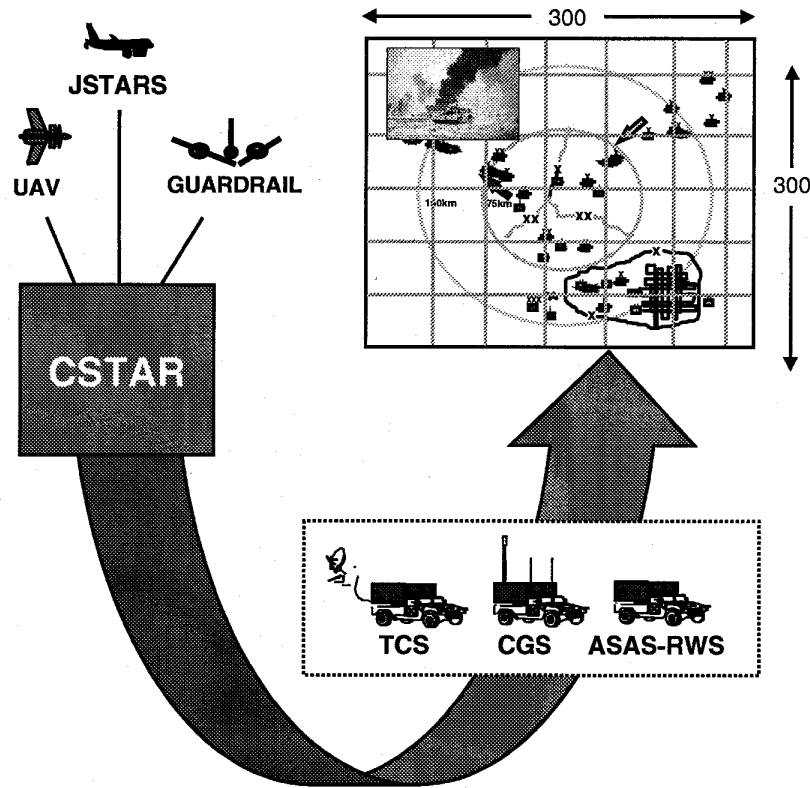
- Digital skills of leaders and operators are extremely perishable
- A “one time” pass through a training institution and/or a “Have” unit is not enough to maintain these skills
- We must develop high fidelity, synthetic training environments to support individual and collective training of these skills in garrison



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# *Actions Being Taken*

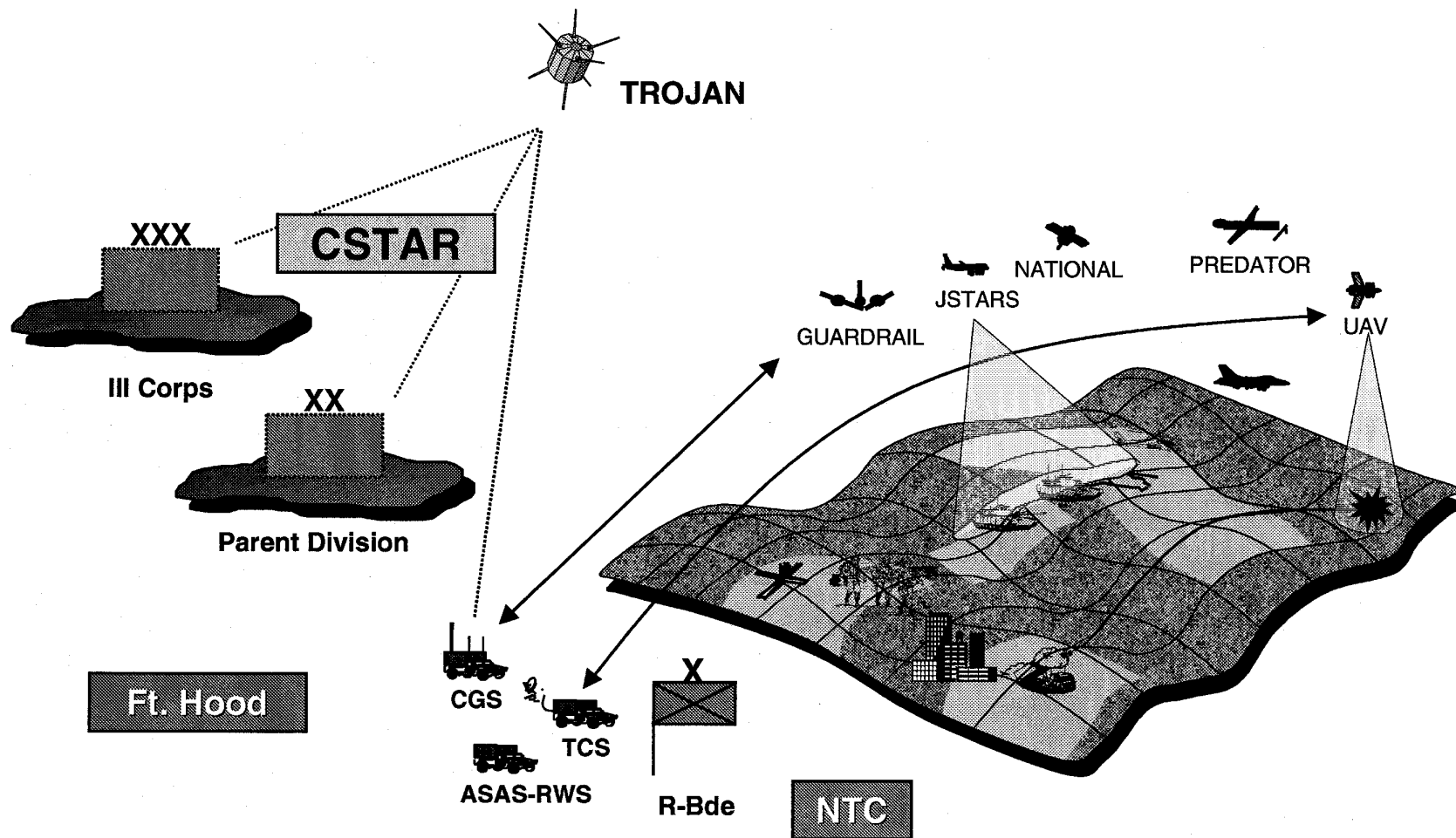
# Synthetic Training Environment



## Combat Synthetic Training Assessment Range (CSTAR) – Phase I

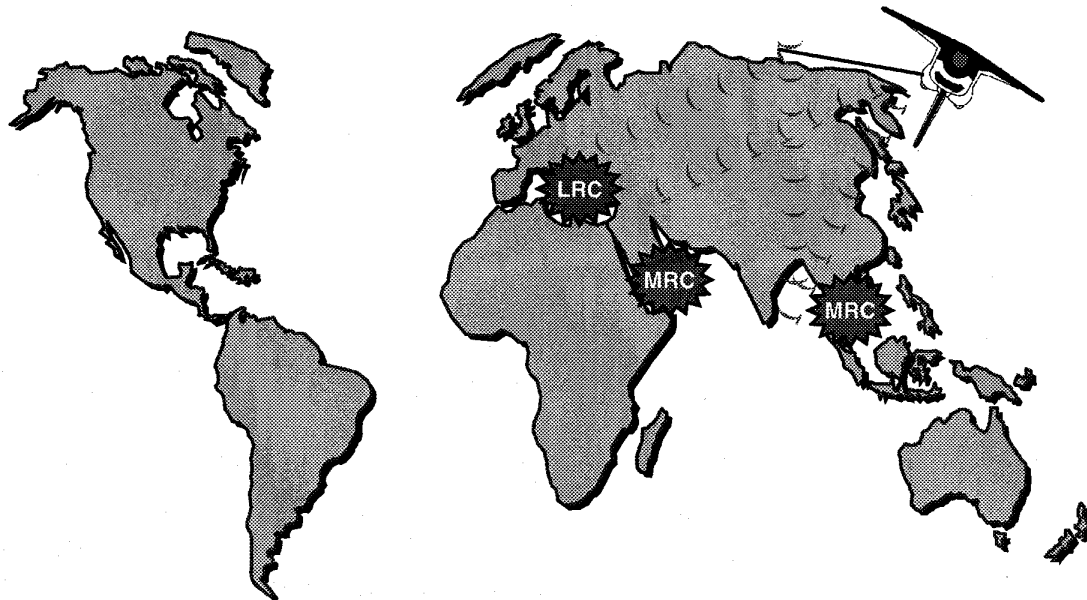
- Merges live play and constructive simulation into coherent 300 x 300 km virtual scenario
  - Employs realistic collection models
  - Supplements or supplants scarce sensors
- Enables battle command training
  - Responsive to commander directions
  - Fuels fires and maneuver integration
- Supports new equipment fielding
  - CGS, TCS, ASAS-RWS

# NTC - Ft Hood (Phase 1)

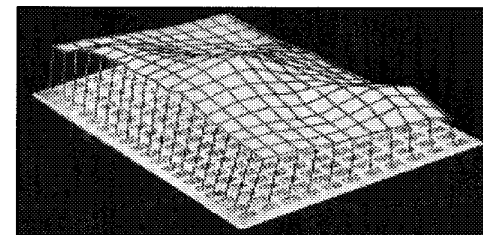


# Digital Terrain Elevation Data

## NASA/JPL Shuttle IFSAR



The Shuttle Can  
Provide DTED Level 2  
Coverage of 80% of the  
World's Surface,  
*In A Single Mission*

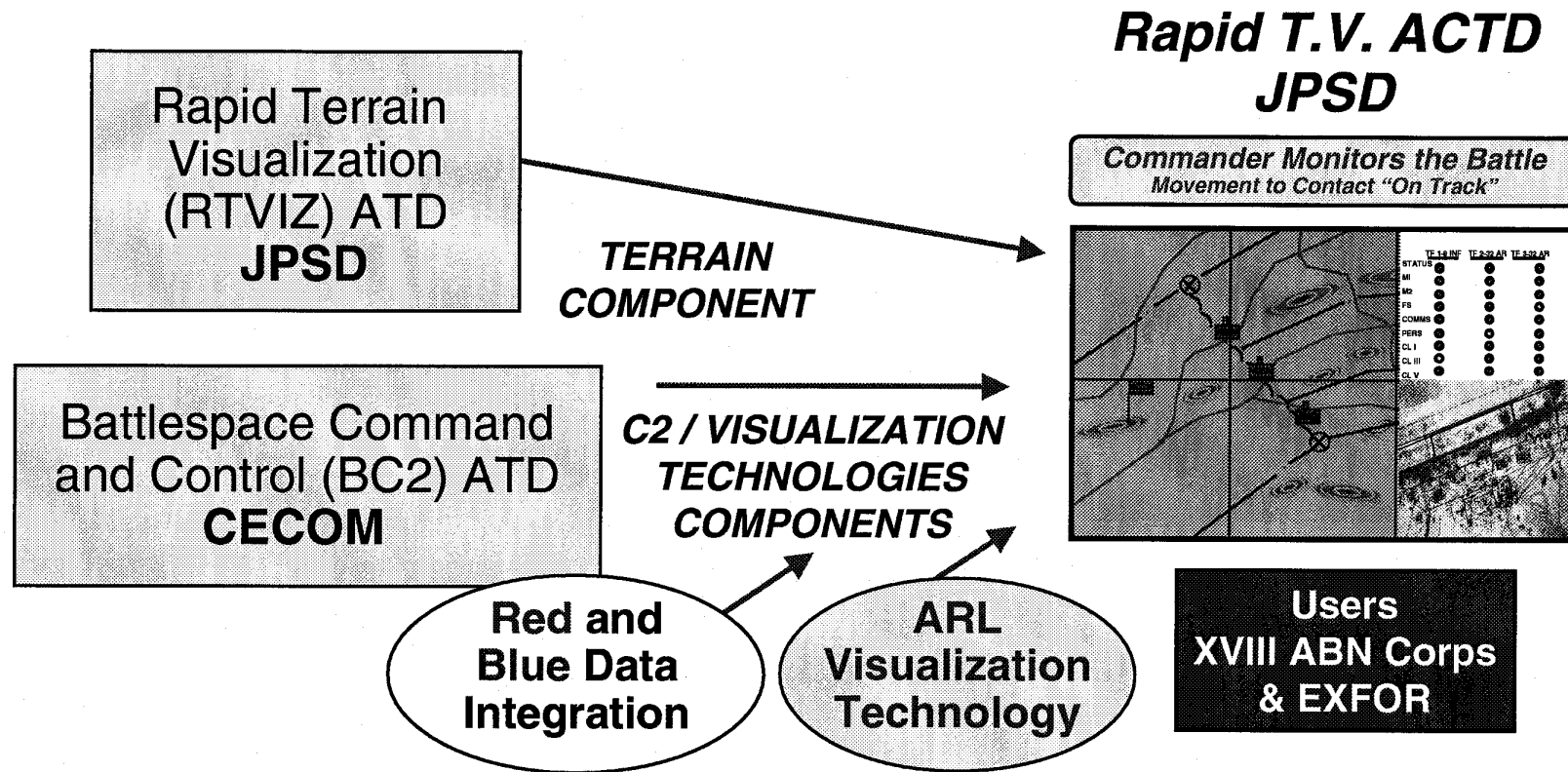


- ! JROC-Approved; PBD Approved; Shuttle Flies in '00, Data in '01
- ! DTED Is a Significant Shortfall--Not Currently Available  
In the Resolution or Timelines Required by the Warfighter
- ! DTED Level 2 Data (30M Post Spacings) Will Provide a Robust  
Standardized Database for Mission Planning and Crisis Response
- ! An Enabling Technology for Battlefield Visualization

**DTED Level 4, 5 (3m and 1m Post Spacings) Required for Operations**



# Rapid Terrain Visualization ACTD Components



**Goal:** To rapidly collect and generate high resolution terrain data in time to support force projection operations and to integrate current situational data and mission planning and rehearsal capabilities.

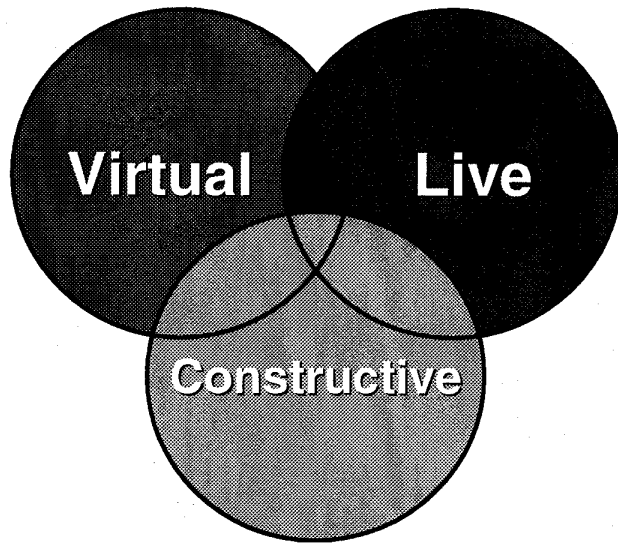
## *Value Added*

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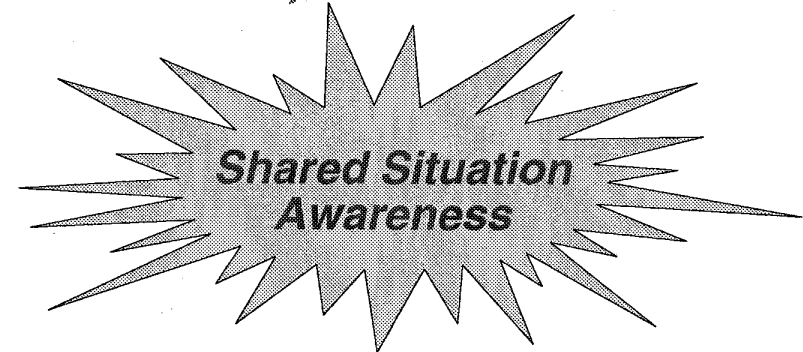
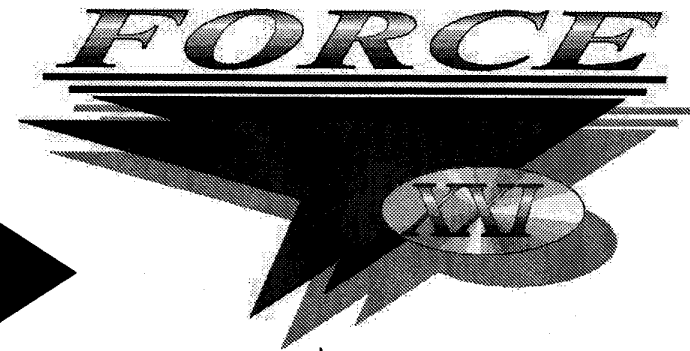
- Merge ATCCS inputs in a single platform, output to large screen displays where appropriate or individual private displays for commanders on the move!
- Move battlestaffs (S/G/J) into the 21st century...“yellow stickie” wargaming on paper maps replaced by competitive force engagement in 3D on high resolution, virtual replication of the battlespace...artificial intelligence aided analysis...objectivity replaces subjectivity
- Enable every commander to see his battlespace, the array of friendly and enemy forces on it, and to plan, wargame and rehearse before ever making contact with the enemy
- Reduced uncertainty—replace subjectivity with objectivity, *across all BOS*

*Battlefield Visualization*  
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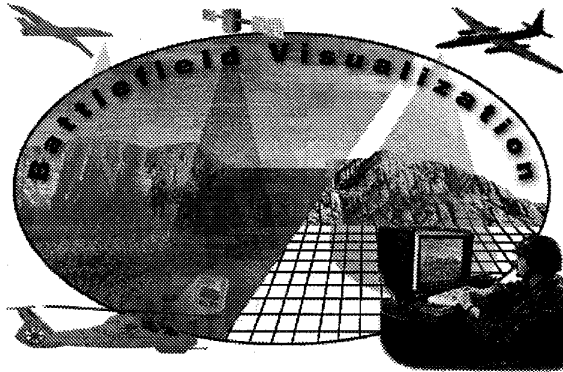
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# *Conclusion*

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- Digitization and enhanced Battlefield Awareness stand to bring about many advances in Battle Command and overall warfighting capabilities
- However, integrating and optimizing digitization and fully leveraging battle awareness are complex tasks encompassing many more challenges than simply acquiring new systems
- There is much more involved in articulating requirements than merely writing system specifications or introducing new technologies
- Thinking through the DTLOMS provides a good start to understanding the full requirement



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# *Backups*



# Common Ground Station Screen

