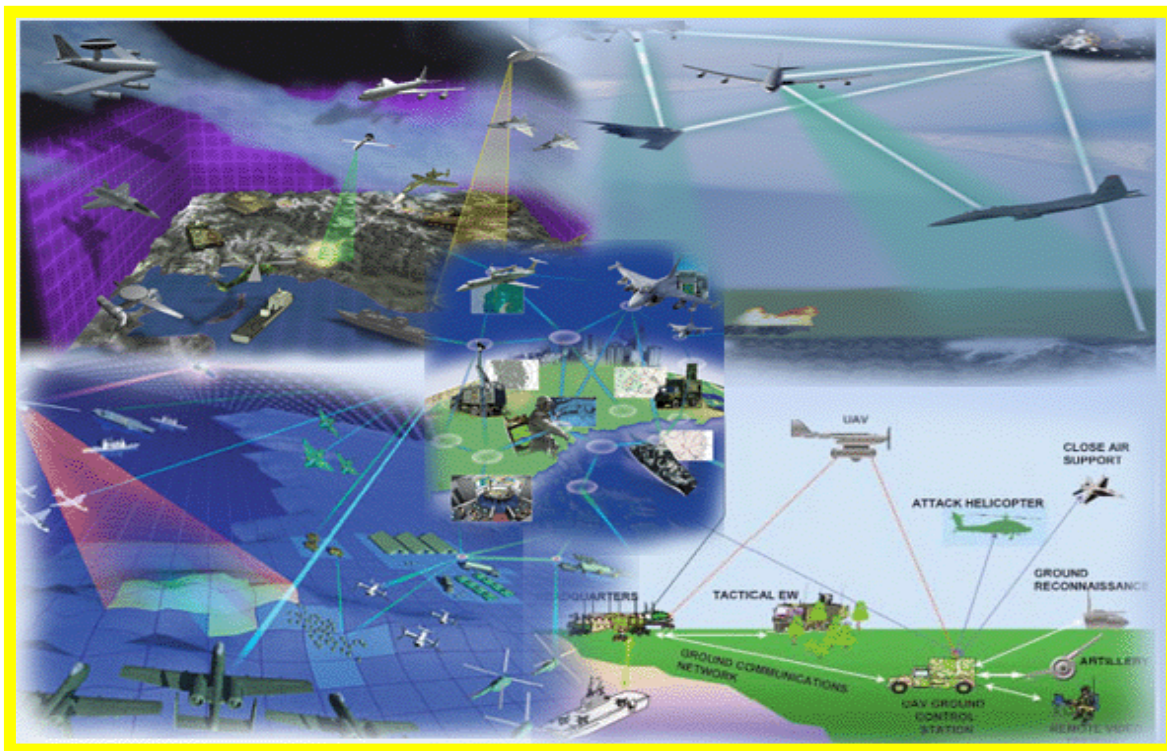# M&S Leadership Summit

Highlight on Issues: Modeling & Simulation as a Critical Technology

Keith Seaman

Senior Advisor
Command and Control (C2) Modeling & Simulation
Air Force SAF/XC

Kenn Atkinson

Deputy Director
Modeling and Simulation Coordination Office

2006 Modeling & Simulation CAUCUS
FOCUS AREAS

- **NATIONAL CRITICAL TECHNOLOGIES**
- **BUSINESS CASE / MISSION THREAD**
- **RETURN ON INVESTMENT**
- **BARRIERS TO SUCCESS**
- **SKILLS**
- **RESOURCES**
- **CAPABILITIES**
- **FORCING FUNCTION**

Let's Not Forget…We Are At War
NATIONAL CRITICAL TECHNOLOGIES

- ENERGY

- ENVIRONMENTAL QUALITY

- INFORMATION / COMMUNICATION

- LIVING SYSTEMS

- MANUFACTURING

- MATERIALS

- TRANSPORTATION

CHANGE AGENTS
M&S Opportunities Abound

- **NATIONAL SECURITY STRATEGY**

- **BASE REALIGNMENT**

- **QUAD DEFENSE REVIEW**

- **JOINT PLANNING GUIDANCE**

- **PRESIDENT'S BUDGET**

- **DOD TECHNOLOGY PLAN**

COMMITTEES:
ARMED SERVICES

SUBCOMMITTEES:
READINESS
TACTICAL AIR AND LAND FORCES

JUDICIARY

SUBCOMMITTEES:
COURTS, THE INTERNET, AND INTELLECTUAL PROPERTY
CRIME, TERRORISM, AND HOMELAND SECURITY
COMMERCIAL AND ADMINISTRATIVE LAW

SCIENCE

SUBCOMMITTEE:
SPACE AND AERONAUTICS

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EMPORIA, VA 23847
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2903 BOULEVARD, SUITE B
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505 INDEPENDENCE PARKWAY
LAKE CENTER TWO—SUITE 104
CHESAPEAKE, VA 23320
(757) 382–0080

J. Randy Forbes

United States Congress

4th District, Virginia

April 26, 2006

The Honorable George W. Bush
The White House
Washington, D.C. 20500

Dear Mr. President:

I am writing to you to follow up on the discussion we had during our meeting on March 29, 2006 about Modeling and Simulation and the recent Modeling and Simulation Leadership Summit. Your declaration of Modeling and Simulation as a "National Critical Technology" essential to U.S. world economic leadership would be a significant step toward advancing your science and technology agenda.

THE WHITE HOUSE
PRESIDENT
GEORGE W. BUSH

For Immediate Release
Office of the Press Secretary
January 31, 2006

State of the Union:
American Competitiveness Initiative

America's Economic Strength And Global Leadership Depend On Continued Technological Advances. Groundbreaking ideas generated by innovative minds have paid enormous dividends – improving the lives and livelihoods of generations of Americans. With more research in both the public and private sectors, we will improve our quality of life – and ensure that America will lead the world in opportunity and innovation for decades to come.

As The Global Economy Continues To Expand And Other Countries Become More Technologically Advanced, The United States Will Face New Challenges. To ensure our continued economic and technological leadership in the world, the American Competitiveness Initiative builds on the Administration's record of results with new investments, especially in the physical sciences and engineering. Investments in these areas will generate scientific and technological advances for decades to come and will help ensure that future generations have an even brighter future.
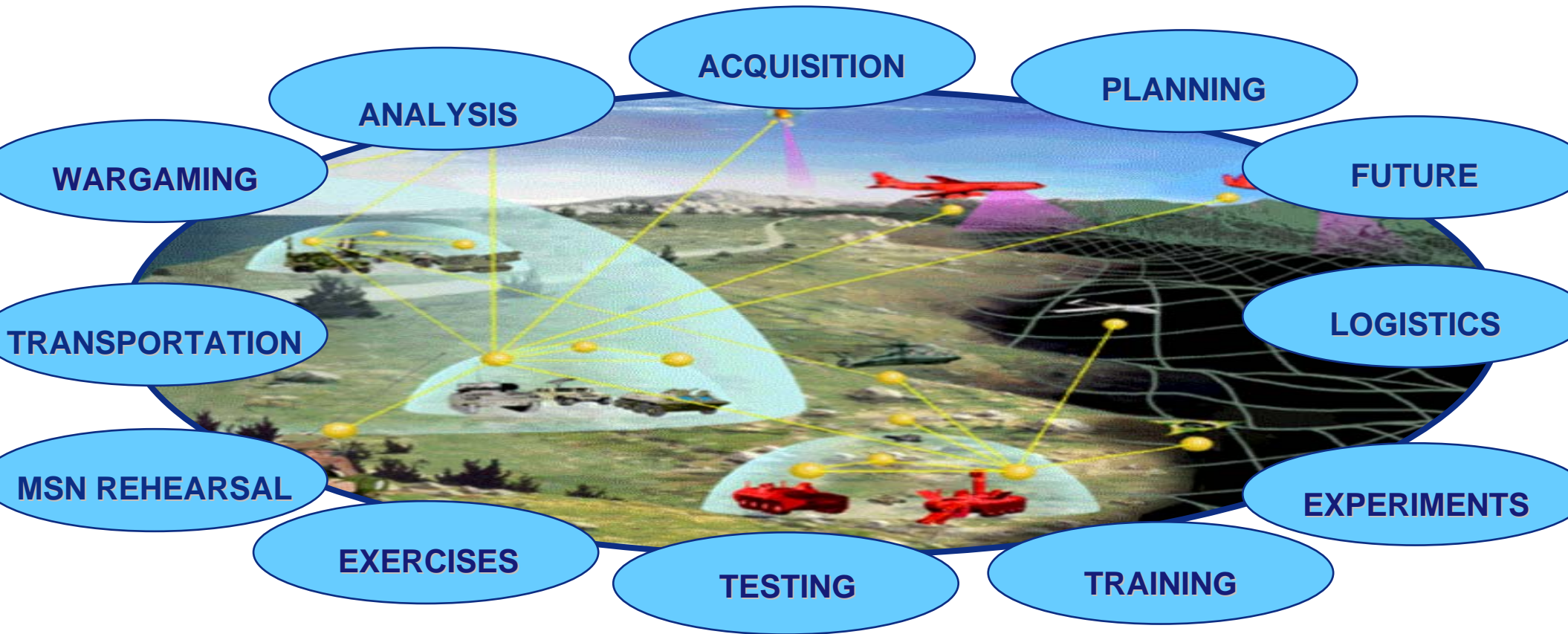
- **Games are good at fulfilling training needs**

  - *I hear and I forget
    I see and I remember
    I do and I understand*

  - **Game based training actively engages the learner**

- **Games are simulations with goals, missions, and objectives**

- **Game interfaces can be reused**
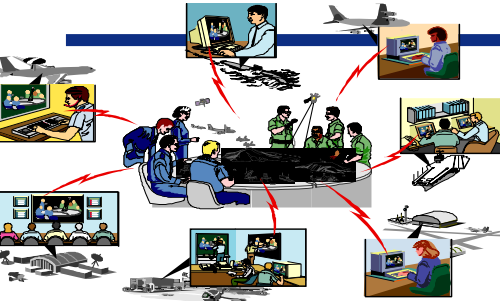
M&S Multiple Activities/Disciplines –
In simulation there is a rerun button!

ACQUISITION

PLANNING

ANALYSIS

WARGAMING

FUTURE

TRANSPORTATION

LOGISTICS

MSN REHEARSAL

EXPERIMENTS

EXERCISES

TESTING

TRAINING

What is achieved from simulation?
1) Safer 2) WX 3) MX 4) Joint 5) Real 6) Greater Security 7) Interoperative
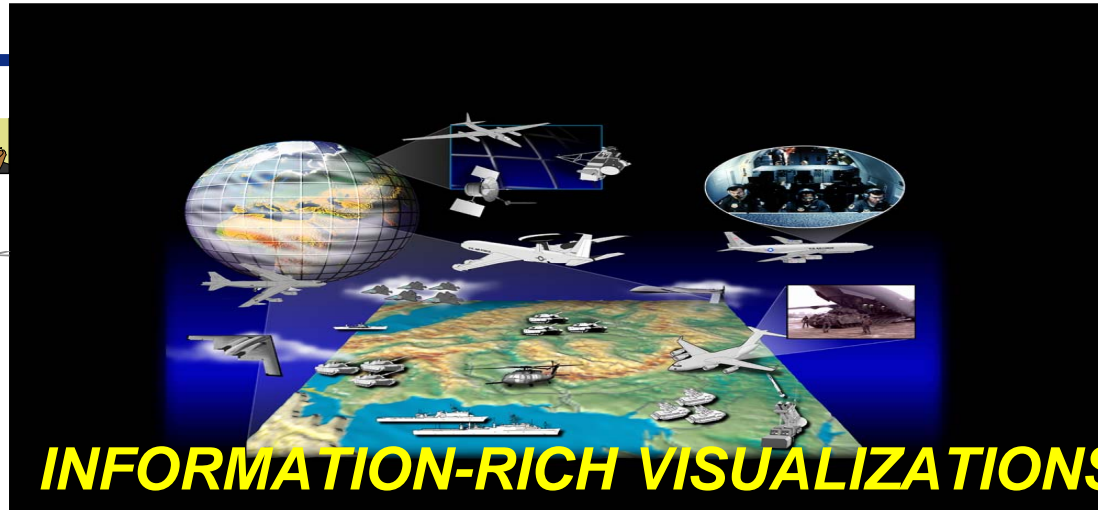
CHALLENGES DEMAND NEW CONSTRUCTS
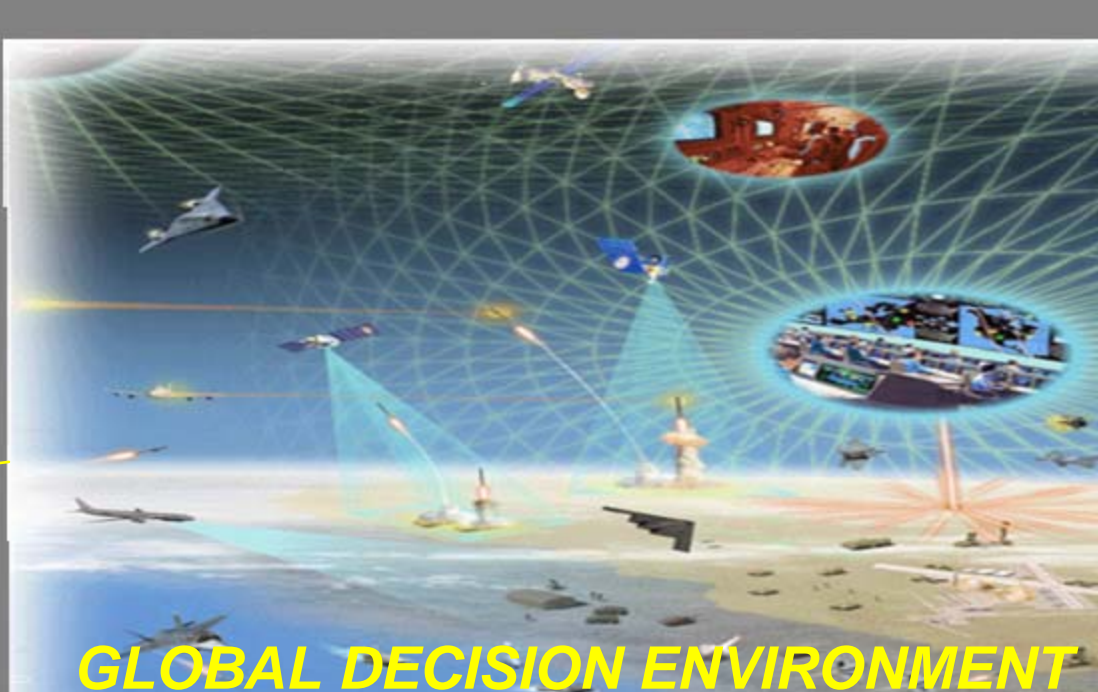
COLLABORATIVE DEVELOPMENT

INFORMATION-RICH VISUALIZATIONS

IMMERSIVE TRAINING

INTERACTIVE PLANNING

COMPETITIVE SIMULATIONS

FUSED EXECUTION

NET CENTRIC OPS

**GLOBAL DECISION ENVIRONMENT**
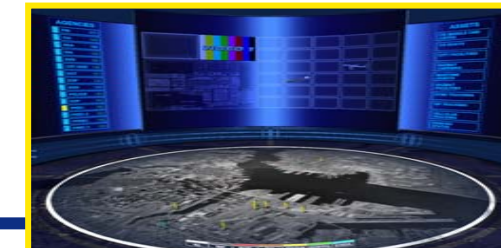
DYNAMIC BATTLESPACE

Challenges For You

- **Synthetic Network Warfare**
- **Constructive Cyber Space**
- **Advanced Simulators**
- **Global Interaction**
- **Human Factors/Behaviors**
- **Directed Energy**
- **Inter-Active Competitive Sims**
- **Virtual Testing/Training**
- **Nano … Bio … Quantum**
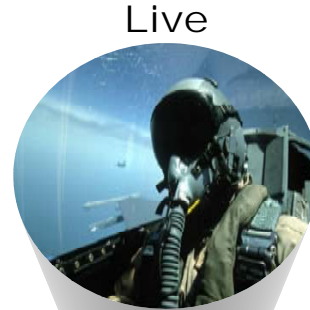- **Live-Virtual-Constructive Integration to Support All M&S Domains**
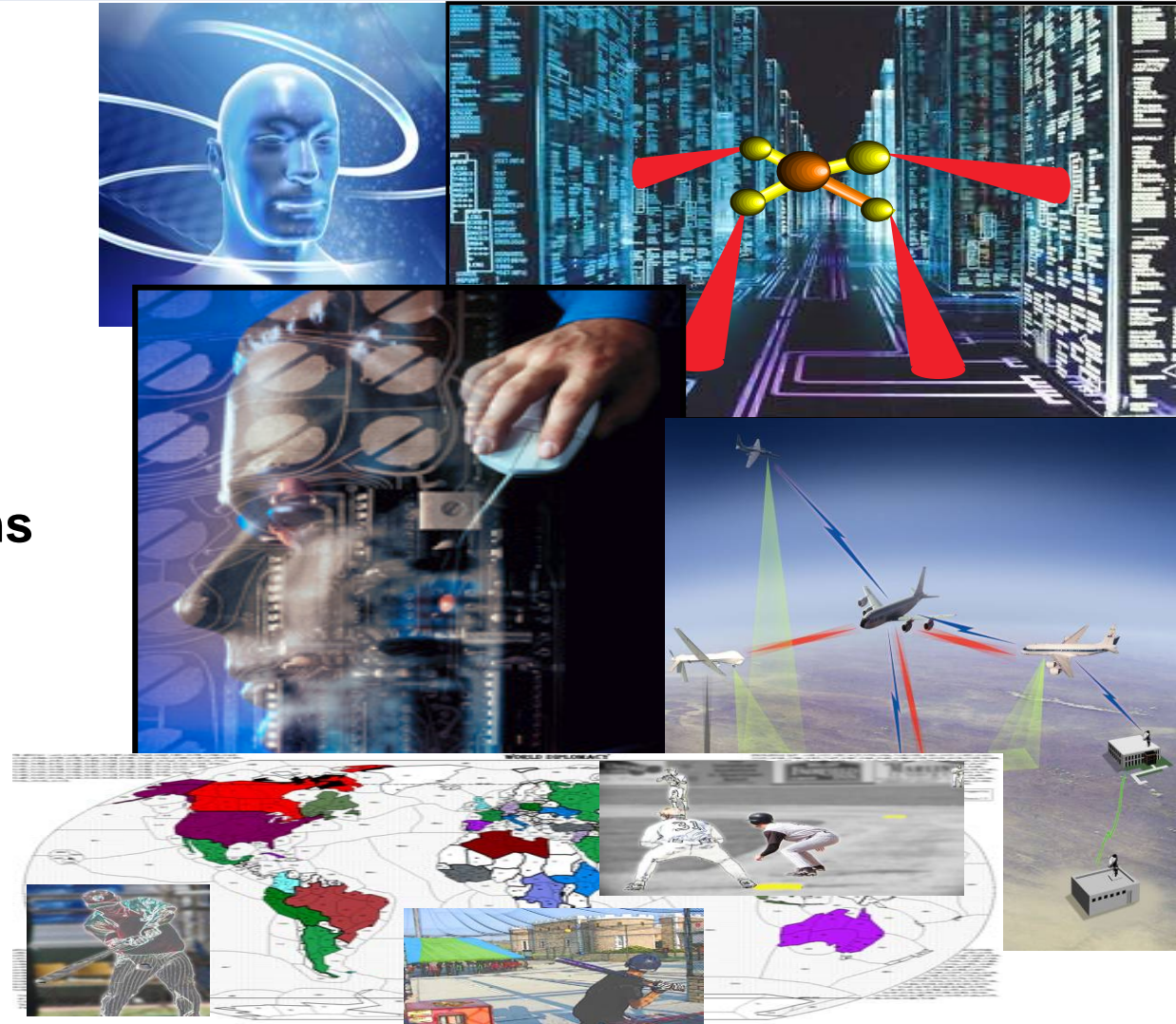
Modeling & Simulation
Live-Virtual-Constructive Integration
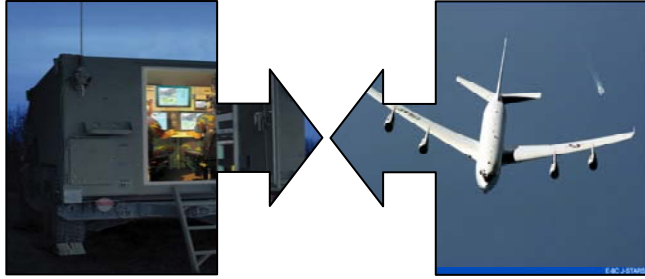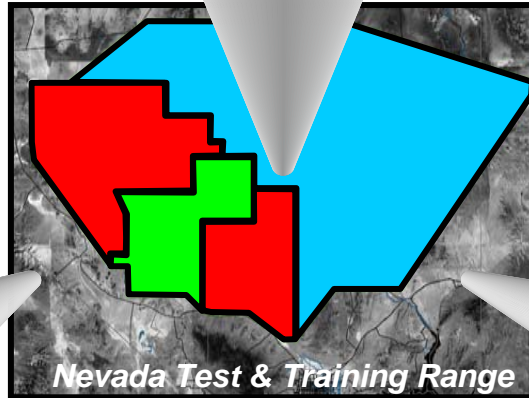

Interoperability Between C4I Systems

Live

Interoperability Between Simulations

• Increasing training realism
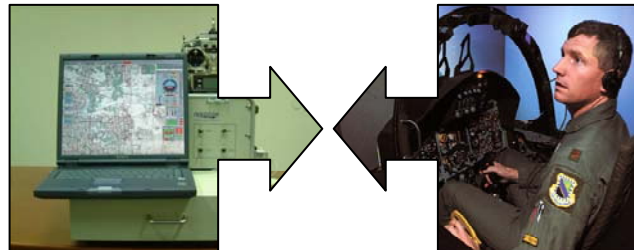• Mitigating resource constraints
• Overcoming geographical constraints

Nevada Test & Training Range

• Enabling Joint interoperability
• Expanding the size of training audience
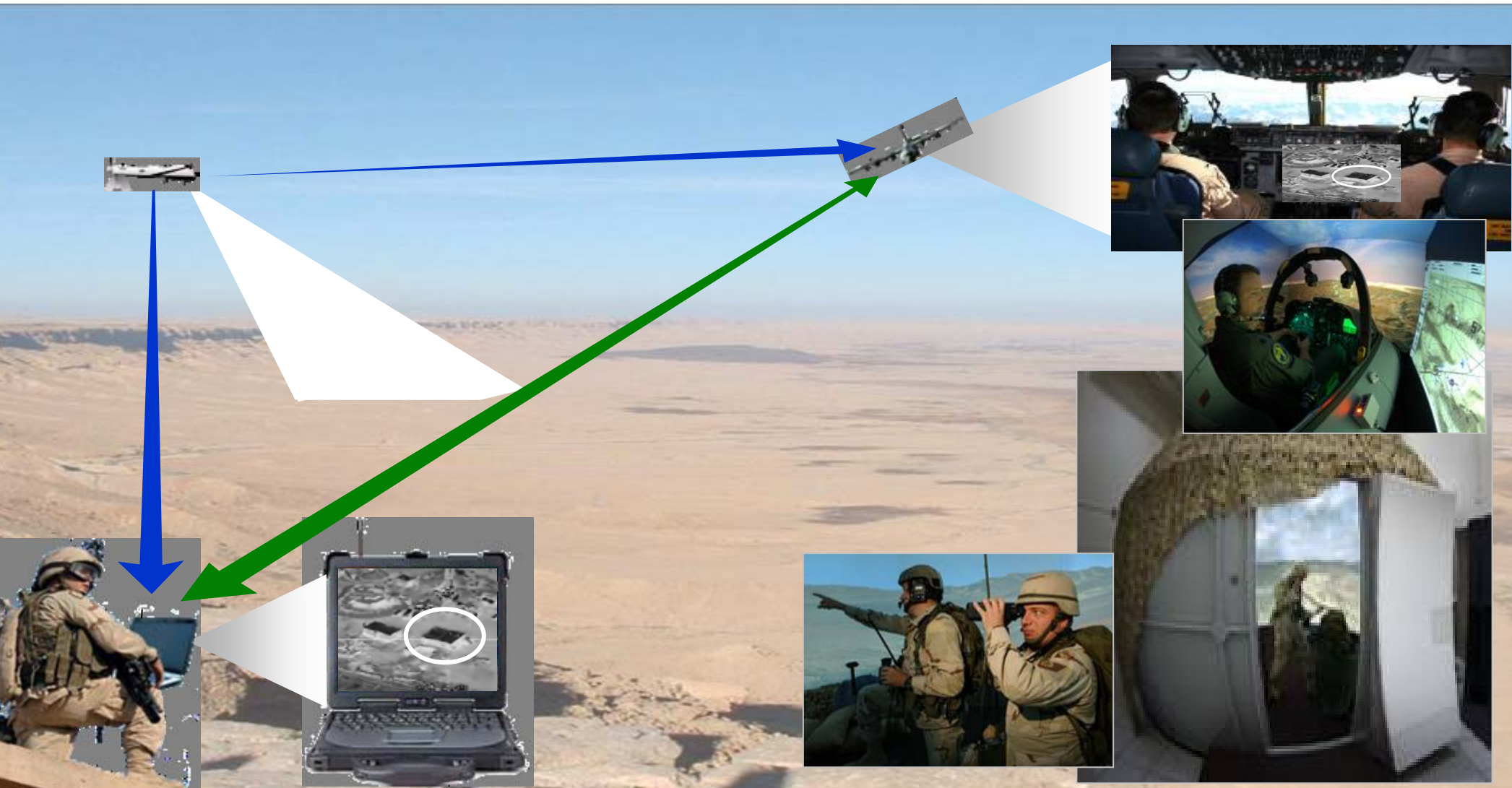• Expand the battlespace

Virtual

Interoperability between C4I systems and simulations

Constructive

Live-Virtual-Constructive Integration
Remote Operations Vehicle Enhanced Receiver

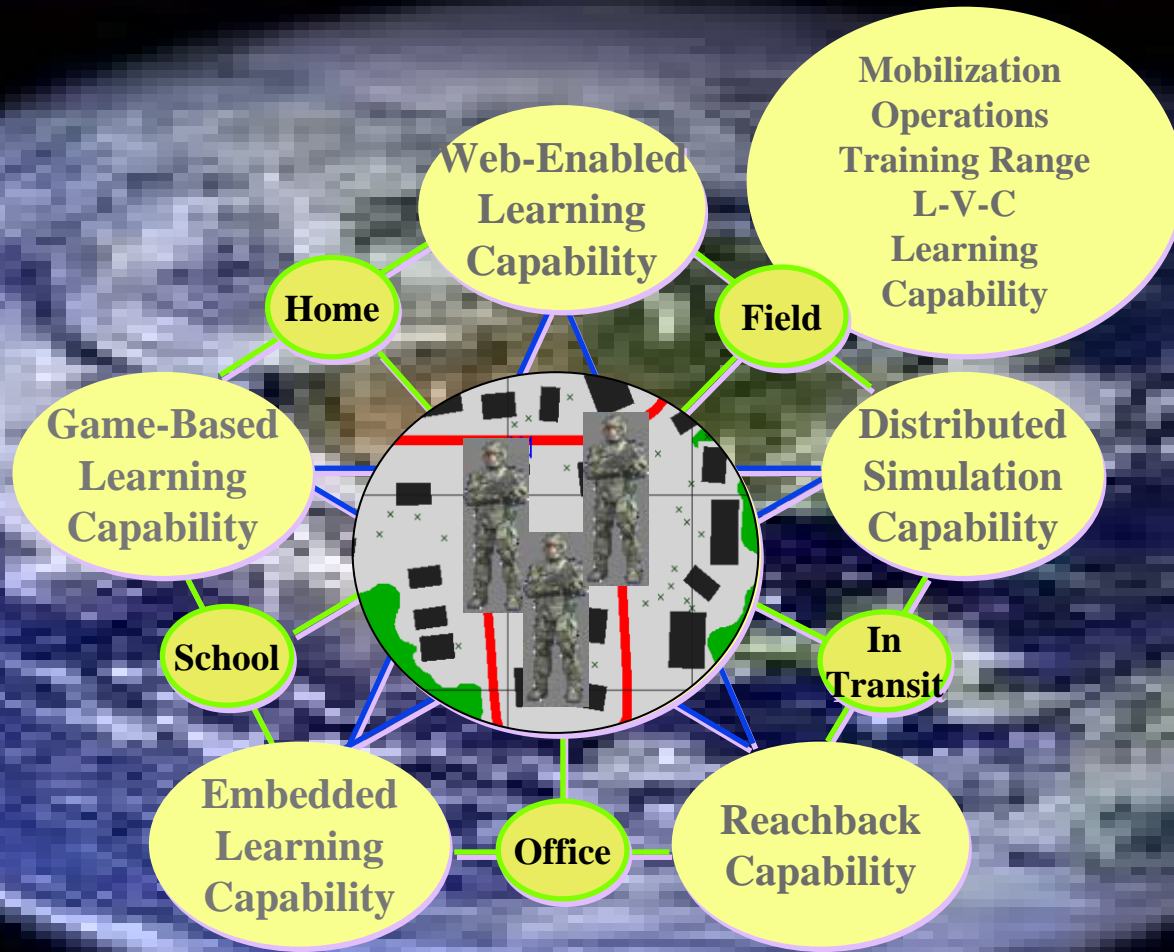**ROVER provides actionable information at the tactical edge**

Modeling & Simulation
Developing Future AMERICAN

EQUIP

ENABLE

EDUCATE

EMPOWER

*Partnering to Define an End-to-End Perspective*

Creating the Competitive Edge

Modeling & Simulation
Return On Investment Through LVC Integration

- **Better Training Through LVC**
  - More Joint Play
  - More use of HD/LD assets
  - Less TDY **(Play from Home Station)**
  - Less Wear & Tear **(Recapitalization)**
  - Test/Implement new tactics/doctrines
- **Shorter Time Frame Through LVC**
  - Mission Rehearsal
  - More Joint representation
- **Value of Improvement Through LVC**
  - Increased Effectiveness
  - Increased Proficiency
  - Reduced Risk
  - Opportunity Savings
  - Cost Avoidance
  - Eliminate Duplication
  - Streamline Processes
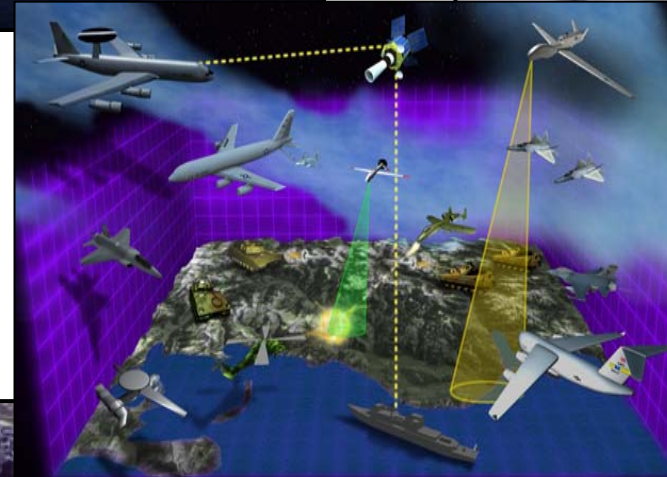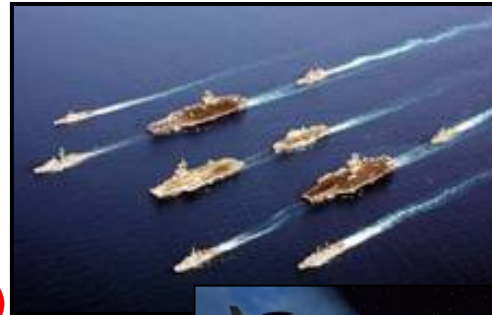
In simulation there is a rerun button!

TRAINING

SPACE

DISASTER

MEDIA

SECURITY

MEDICAL

ACADEMIC

ECONOMIC

CYBERSPACE

PLANNING

HUMAN BEHAVIOR

TOWER OF BABEL

Modeling & Simulation
Supporting the Warfighter

Operational Training
Warfighter Ready for the Fight

Mission Rehearsal
Dynamic, Live, Interactive

Decision Support
Compete, Challenge, Confront

Empowering the Warfighter, Enhancing Judgment, Effecting Change, Expediting C2 and Elevating Combat Readiness!

Questions?

CHALLENGES DRIVE OPPORTUNITIES

Existing Technology	Merged for New Capability	Unforeseen Consequences

First Information Age

Paper
Wine Press
Oil Based Ink
Official Seals
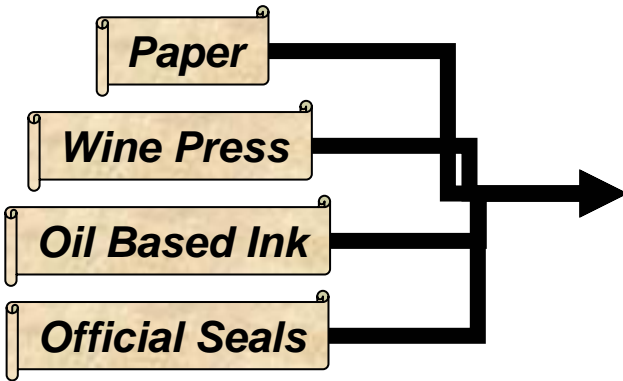
Challenges in 1494

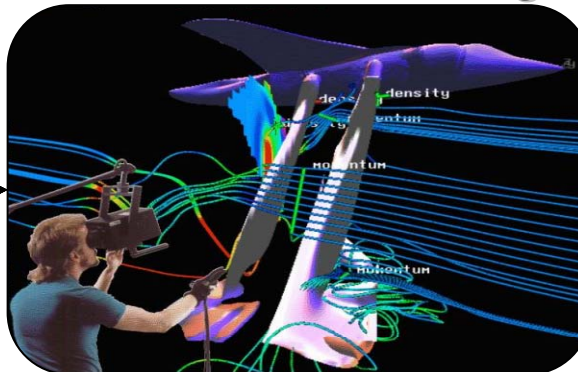**Control over standards – Different Size Type Sets**

Distribution of books poorly organized

No transport systems for books

No "advertising" mechanisms

Low literacy rate in Europe – Need for literacy education

Second Information Age

Computer
Networks
Software
Television
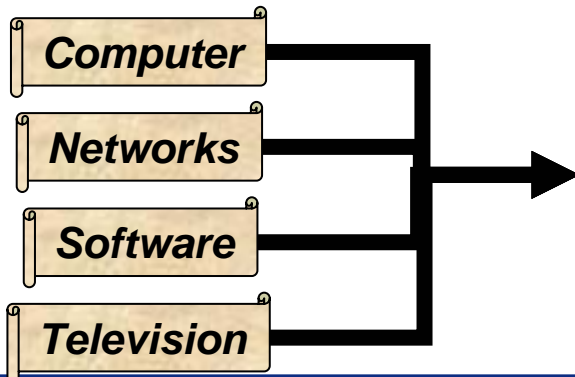
Challenges Today 2006

Control over standards

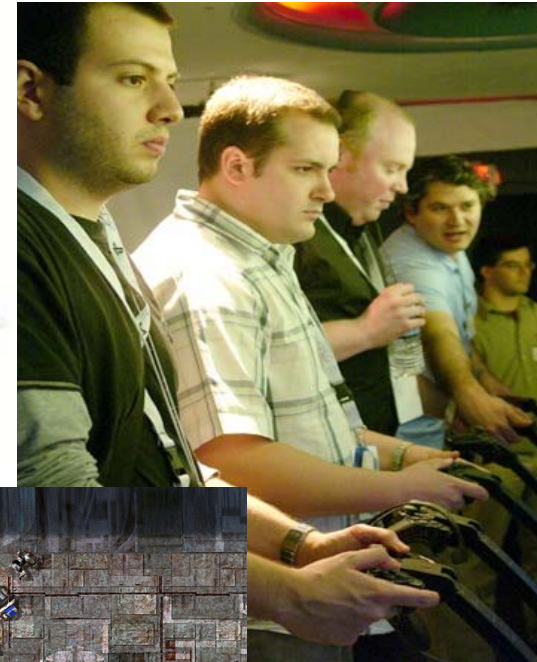**Locating information difficult**

Communication bandwidth problems

No "advertising" mechanisms

Lack of technology education

Types of Strategy Games

- **Abstract strategy**
- **Simulation**
- *Real-time strategy*
- **War game**
- **Real-time tactics**
- *Turn-based*
- **City building**

M&S as a Shared Capability

- **M&S is no longer a resource that demands specialized computer hardware, expensive customized development, and dedicated engineers**

  - **Lower computational footprint of low to mid fidelity models and simulations make them accessible on a variety of hardware platforms (PDAs, laptops and desktops, supercomputers…)**

    - **Revolutionizes the applicability of M&S to a range of questions and issues focused on effects based outcomes**
    - **Allows selection of the proper level of M&S fidelity for current needs**

  - **COTS tools allow common simulated worlds and scenarios to be shared across a range of hardware platforms without significant reinvestment in development**
    - **Use standard and common data formats as input and output**
  - **M&S can be made accessible to individuals… TODAY!**
    - **Bring scenario creation tools to end-users and SMEs at the desktop**

| Low Fidelity | Medium Fidelity | High Fidelity | Ultra High Fidelity | Granular Fidelity |

Availability of COTS Tools Changes Business Models

- **Fill the gap between BOGSAT and complex models**
    - **Enhance GOTS models/simulations with COTS tools**
    - **Provide tools to SMEs to develop simulations at the desktop**
    - **Run exercises and training with local resources**

- **Enable scenario and world asset sharing through well defined interfaces using common data formats**

- **Recognizing the power of COTS tools:**
    - **Tools development funded by the corporations and offset by licensing lessens government investment in development**
    - **Use of standard data formats allows open choice of vendors not tying M&S success to a single contractor**