DEFENCE R&D DÉFENSE

Virtual Combat Systems

The Future of Military Planning and Command Systems?

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DRDC Atlantic

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Defence Research and Development Canada
Recherche et développement pour la défense Canada
Canada

DRDC = Disruptive R&D Canada

Outline

- Command and Control in 2025 vs 2005
- Convergence of Technology and Usability
- Simulation and Gaming
- Key Technology Challenges

Planning Process - 2005

TOCA

CDS

Final Approval

Force Generators

Initial Commitment

Tasking Request

Contingency OP Plan

Joint Staff

High Level Intent
Objective
ROE
Resource Plan

Modelling and simulation

Force Development
Strategic Planning
Force Planning Scenarios
Economic I/O
Foreign Pol Models

Text, voice messages

Staff planning aids
Env Prediction Sys
Comms planning
Logisitics Planning
MTOGS

Text, voice messages

Shore based Operator Trainers
Sim/Stim of specific kit

Voice

Tactical Development
Search Plan Analysis
Shore based Team Trainers

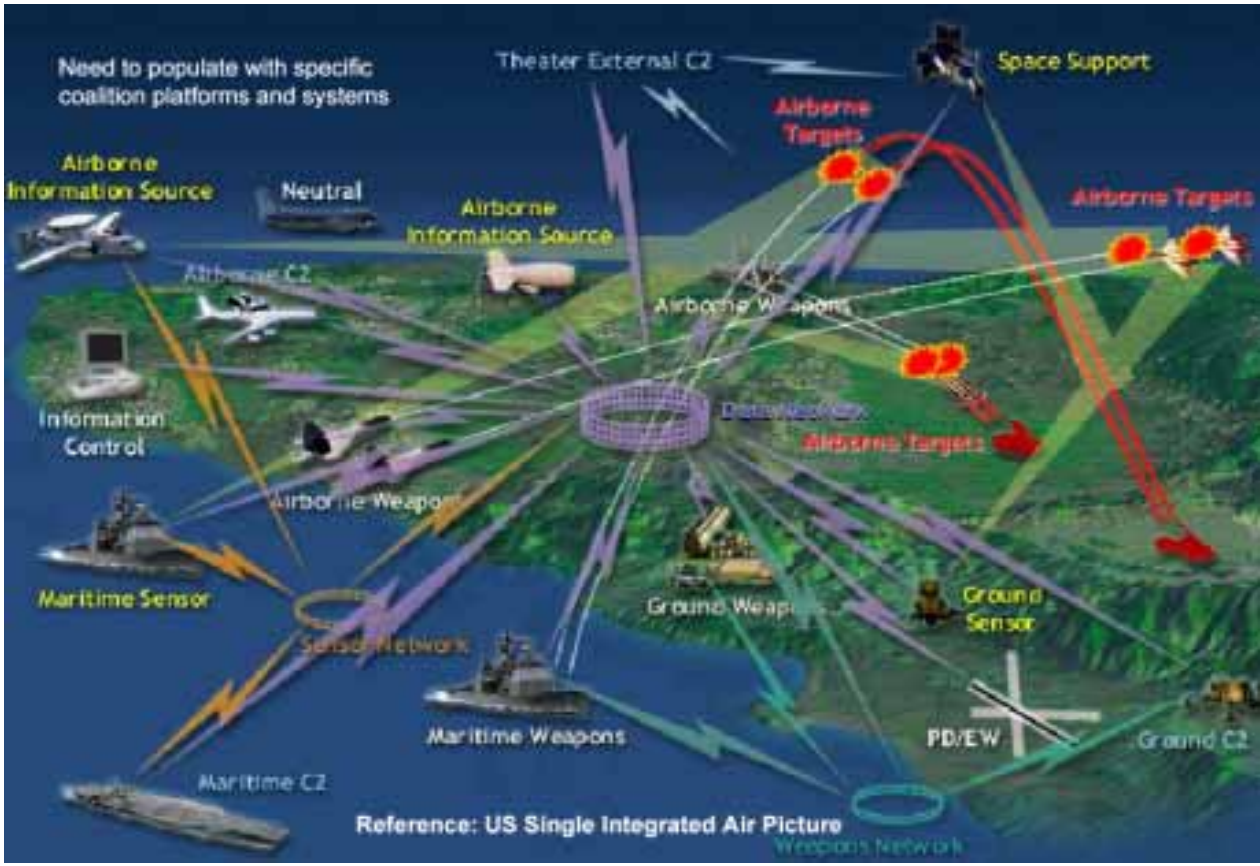
Strategic Modelling and Simulation

Military

Political

Socio-Cultural

Economic



Strategic Modelling and Simulation

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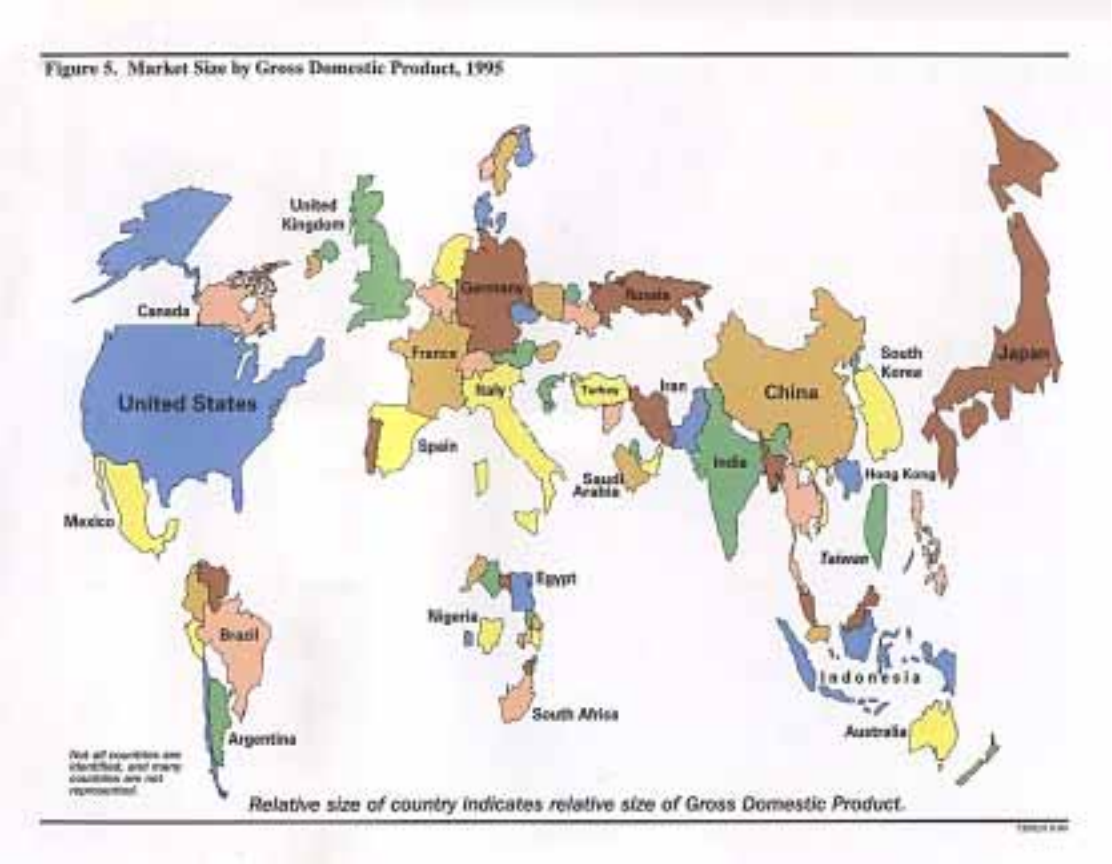
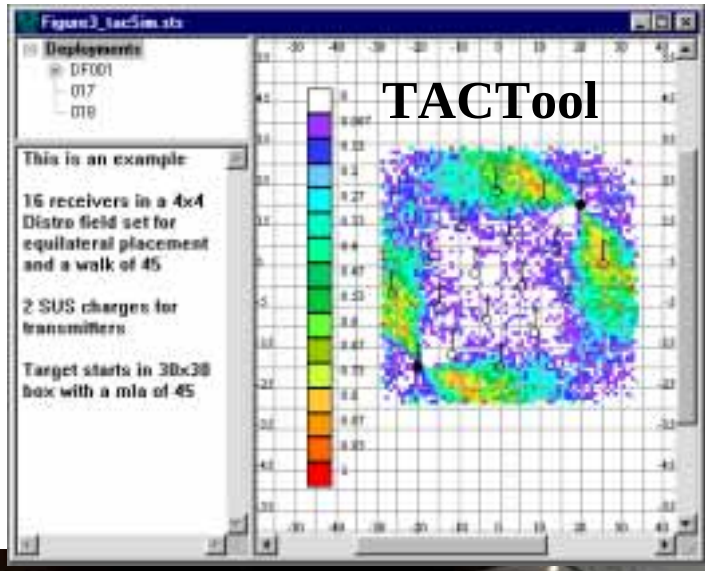
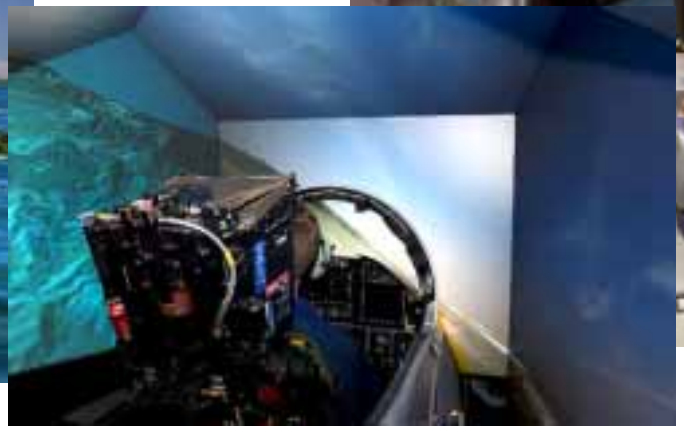


Operational Modelling and Simulation

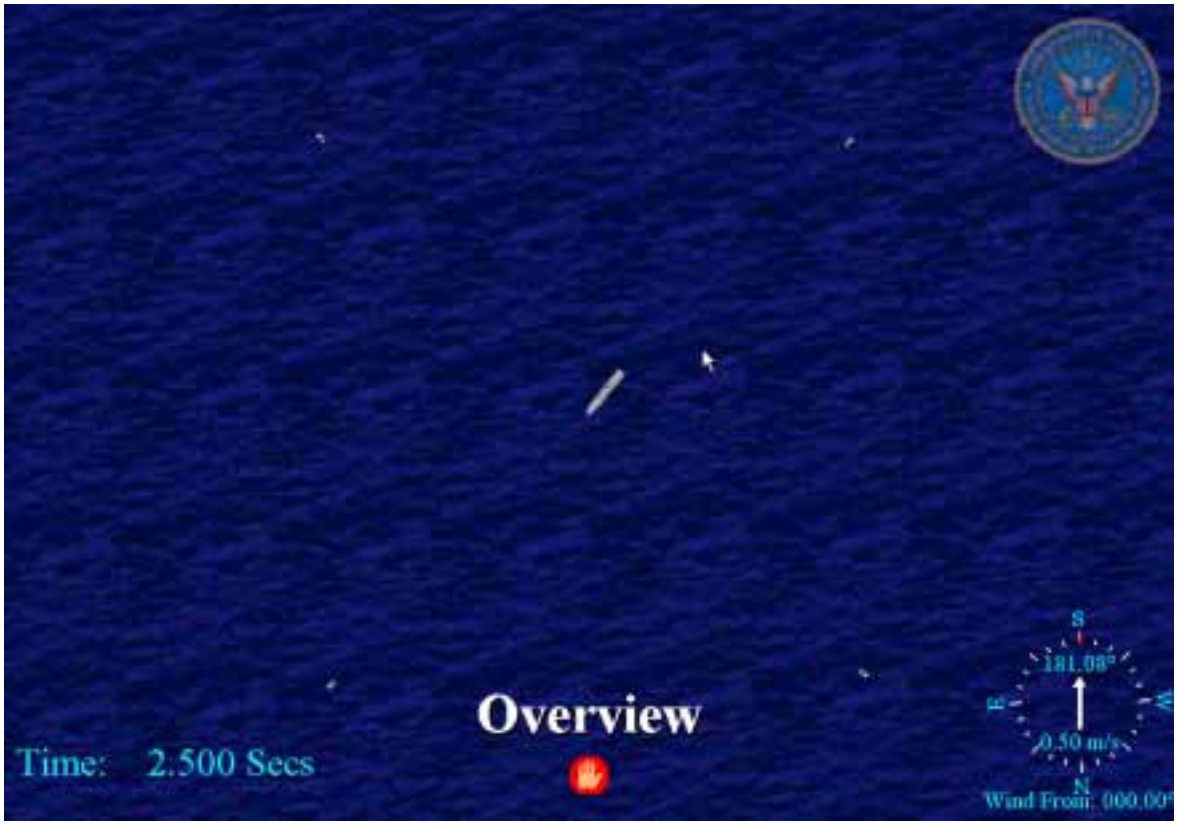
- JSAF – Joint Semi-Automated Forces
- OneSAF
- MTOGS – Maritime Tactical and Operational Gaming System

Tactical Level Modelling



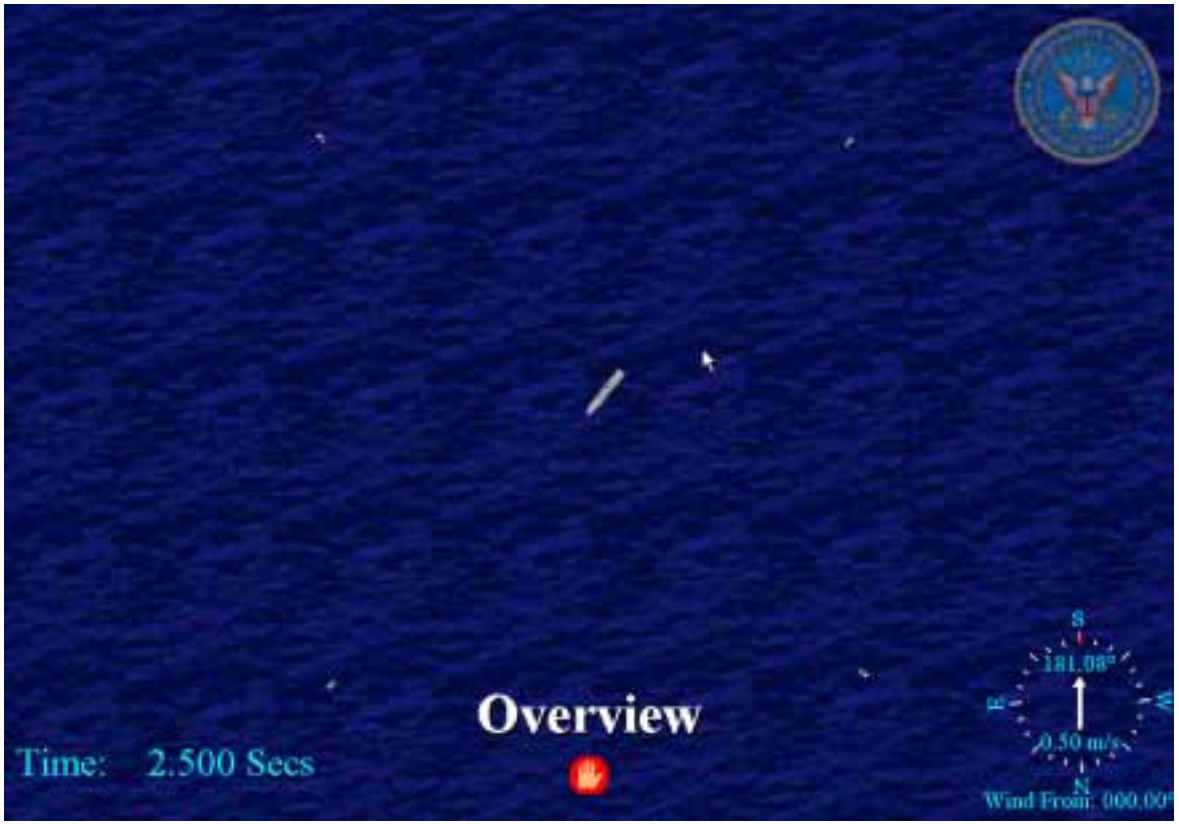


System Level Modelling



CFMWC 2003

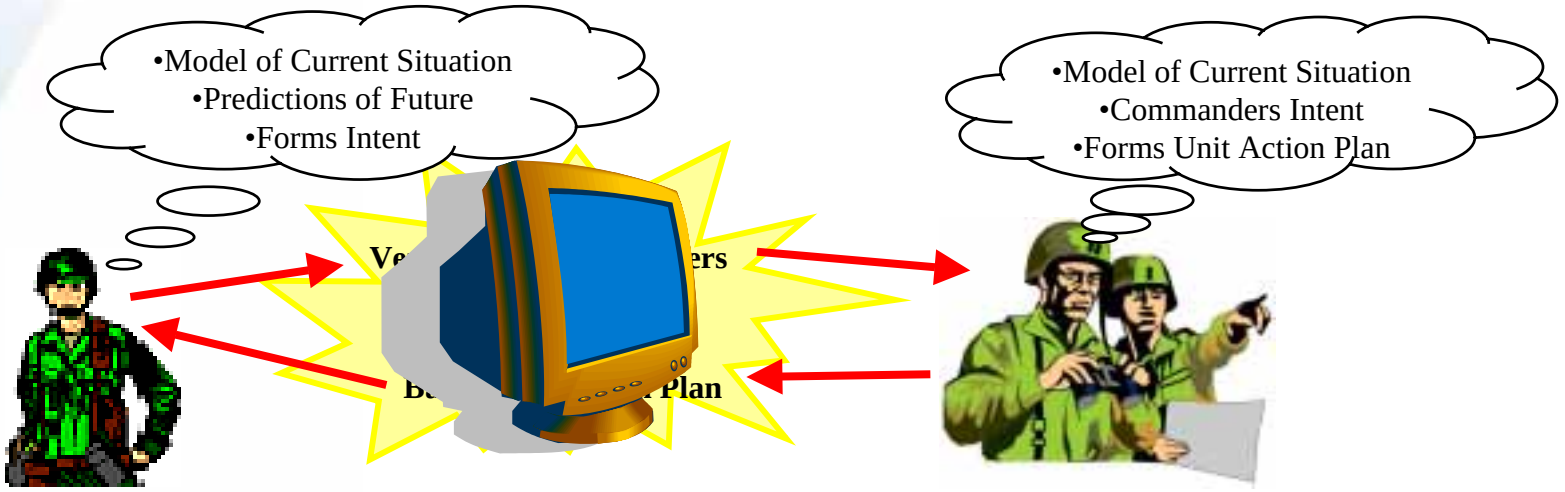
System Level Modelling



CFMWC 2003

Command and Control

So what's wrong with this picture?



- ***Computers Everywhere and In Everything: exploring the intersection of cyberspace and life and the implications for Defence and Security***
- Simulation Everywhere and In Everything exploring the intersection of virtual and real life.

Planning Process - 2025

TOCA

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Simulation and Parameters

High Level Intent
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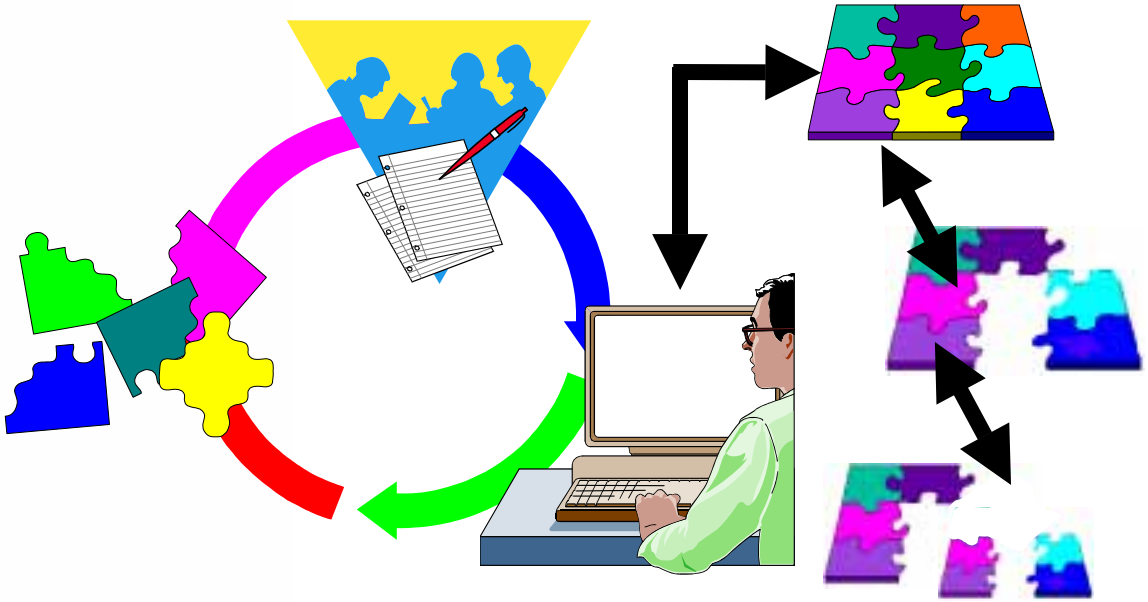
Resource Plan

Command and Control

Intent and Conceptual Model Development

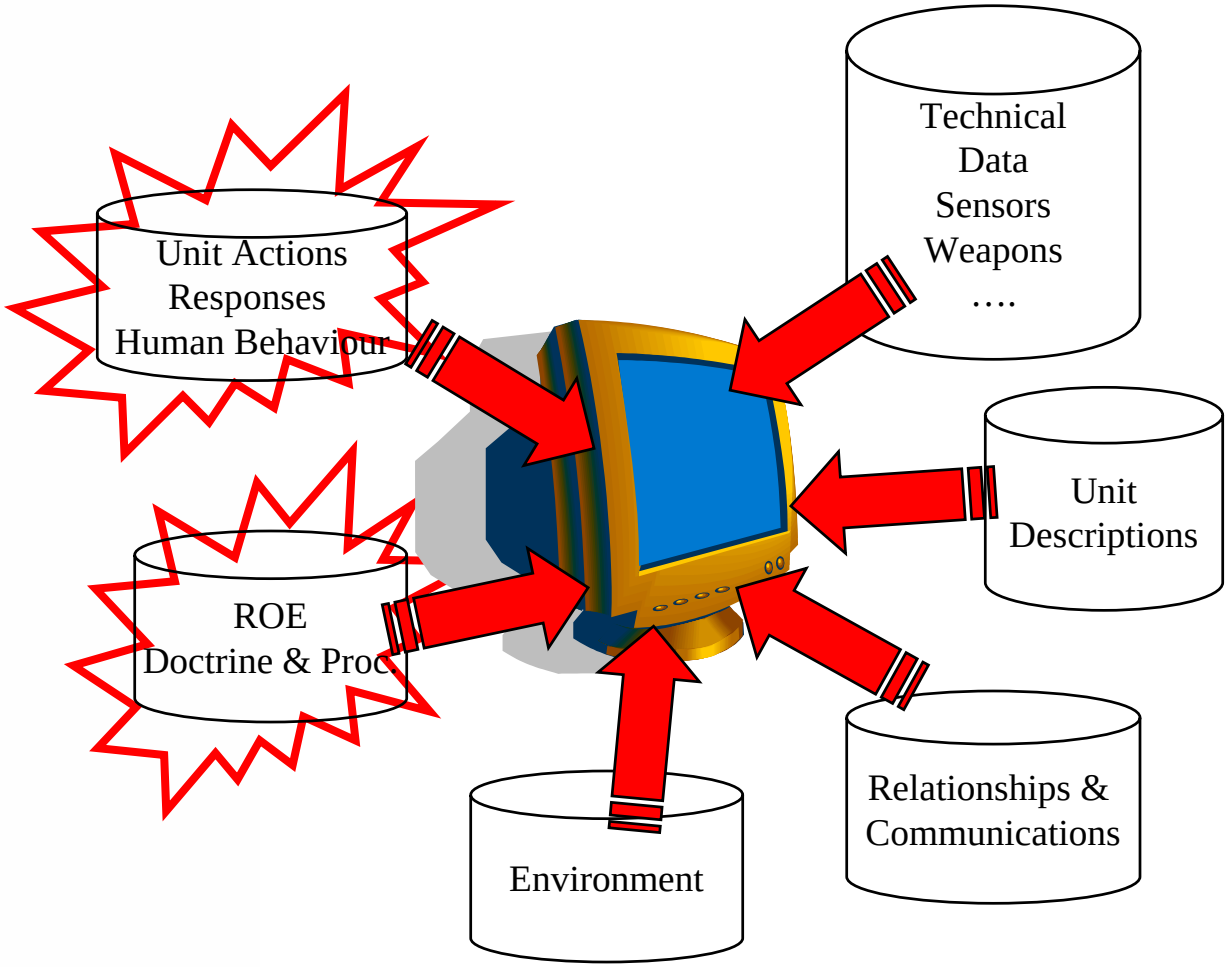


Overall
EBO Intent

Military
Operational
Intent

Military
Tactical
Intent

Simulation Configuration



Simulation in Command Systems

- Commander “What if” decision making aids
- Continuous updating/evaluation of tactical options over time
- Artificial stimulation of sensors and combat team in place for team training and concept development
- Battlespace adaptivity of sensors and weapons
- Sensor-driven simulation comparison with Commanders Intent

Convergence of Technology

- Distributed user communities and high-bandwidth satellite-based communications networks
- Increasing power and availability of computation
- Distributed simulations
- Agent based software
- Gaming friendly generation

Military Gaming

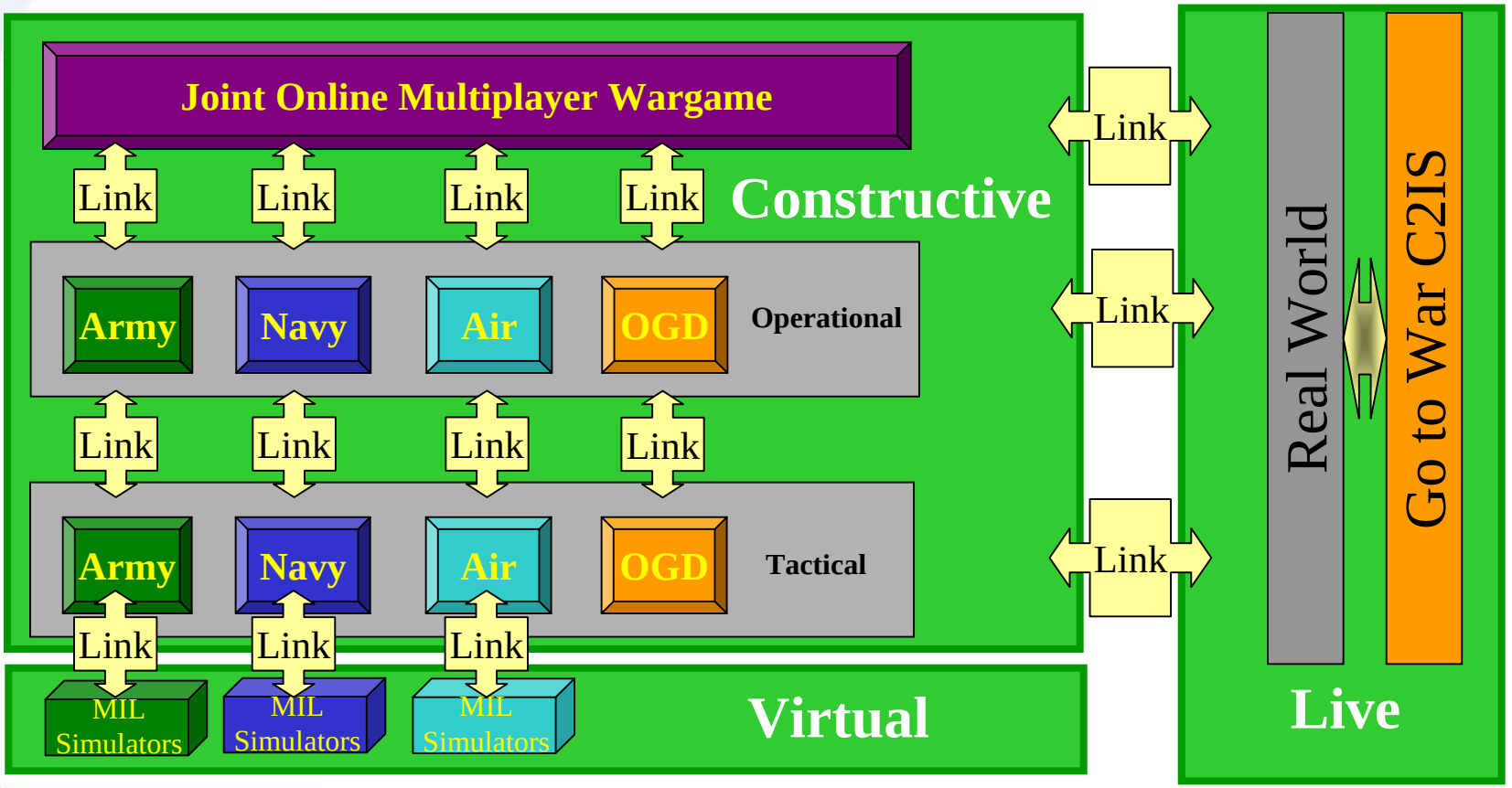
- Whole generation who have grown up with computer simulations (called video games)
- Slick graphics and rapidly improving game engines
- Training
  - Problem solving and strategy
  - Capability relationships
  - Team building
  - Concept development

650 MB Downloadable and Free – a toy or a recruiting and education tool?

Caveats

- Not Reality and unlikely to ever be reality, but neither are current tools.
- Procedural Trainers need high fidelity
- Simulated entities (SIMS) only have the relationships programmed in
- SIMS may have unintentional relationships
- SIMS do not generally reproduce the reactions of real-life combat
- Verification and Validation are important and expensive
- Simulation is not cheap, only cheaper than alternatives.

M&S Capability for Future C2



Based on AEC 2003

Synthetic Environment

Technology Challenges

- Interoperability of games/simulations, data formats, game engines
- Reactive artificial participants – Human Behaviour Models
  - Reactive and proactive tactics
  - Red force
- Scenario Design and configuration tools (easy to use)
- Realistic environmental descriptions
- Specification of flexible output metrics for decision-makers
- Trust – both in the simulations and in the users

The Future Planning and Command Systems

- Decision Making by humans
- Situational Awareness enabled by continuously updated simulation
- Intent communication enhanced by use of simulations linked between the levels of the command chain
- Simulation scaling from strategic right down to individual weapon systems
- A self-synchronizing operations enabler

Questions?

No, we do not have a simulation to model your questions but we are working towards the simulations to enable this vision