

# MICA: Mixed-Initiative Control of Automa-teams

Dr. Christopher L. Johnson

703-983-7831 • [cj@mitre.org](mailto:cj@mitre.org)

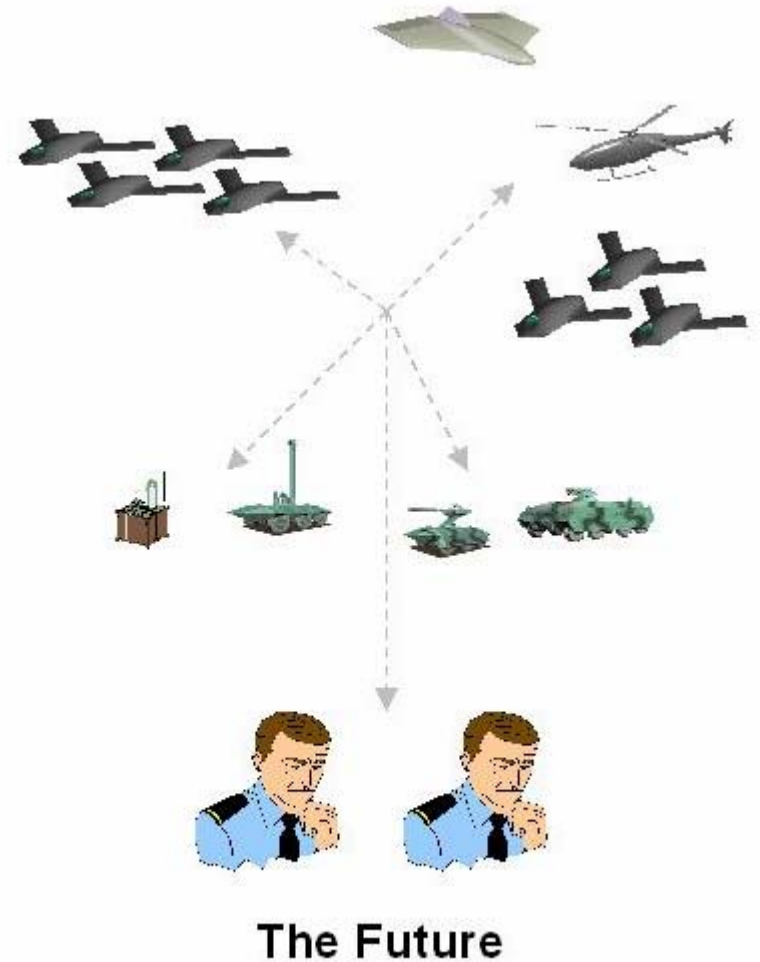
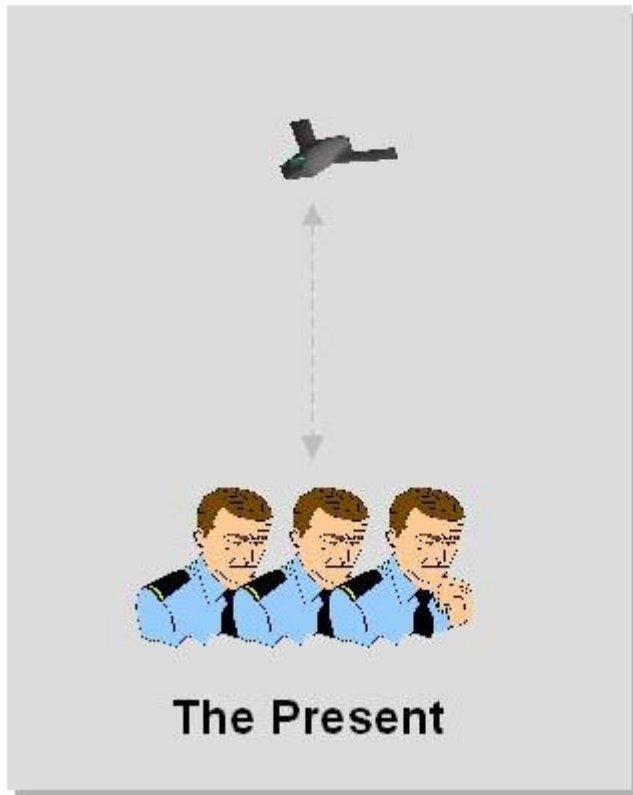
DARPA IXO



# Problem

- **Changing battle management needs are introducing new demands on human capabilities and skills—for example:**
  - **Decision times are being greatly reduced**
  - **Large numbers of autonomous entities are being introduced into operations**
- **People will remain critical decision-making elements in battle management, yet there has been limited consideration of human cognitive factors within battle management systems**

# Background



# Objective



- **DARPA's objectives for MICA include:**
  - **To enable multi-level planning, assessment, and control of distributed, large-scale teams of semi-autonomous forces with collective objectives**
  - **To determine effect of human cognition as a critical decision-making component of large-scale, real-time, highly agile battle management systems**
  - **To develop battle management systems that complement the strengths and limitations of human cognitive performance**



# Activities

- **MITRE activities support MICA program management by providing expertise on human centered design and supervisory control issues involved in controlling autonomous teams**
  - **Coordinate with program researchers to identify shortfalls in addressing human cognitive issues**
  - **Assist in the development of models, simulations, and prototypes to deal with key issues where state-of-the-art fails to support military goals**

# Highlight

## Participating Researchers

**Primes - Address all levels of the MICA problem**

Alphatech



Honeywell

**Provide Open Experimentation Platform**



## **Academic Primes**



CarnegieMellon

CORNELL  
UNIVERSITY



**Experiments - Address subsets of the MICA problem**

**Micro Analysis & Design • MIT • Penn State •  
Stanford • University of Washington**



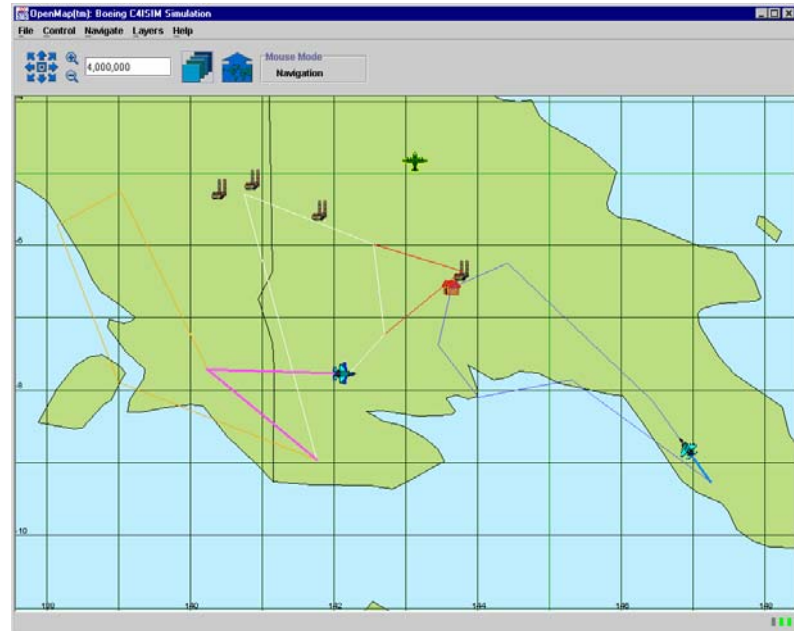
# Highlight



**Boeing has already released initial build of Open Experimentation Platform (OEP) to contractors to begin exploring research issues**

**Based on existing Boeing C4ISM architecture**

**Initial Focus: Suppression of Enemy Air Defense (SEAD) mission**



# Impacts

- **Potentially revolutionize military operations**
  - **Increase availability of manned resources by freeing human personnel from dull, dangerous, and costly tasks**
- **Address relevant issues for other critical programs, such as Future Combat Systems (FCS) and Unmanned Combat Aerial Vehicles (UCAV)**
- **Influence direction of next generation battle management systems towards better cognitive systems engineering**

# Future Plans

## DARPA's future plans for MICA

Develop relevant, demanding challenge problems for evaluation

Expand OEP incrementally to support MICA issues and challenge problems

Demonstrate with hardware platforms by end of program: UAV current target

Ensure needs of human operators are met throughout research and evaluation

