Introduction to Cougaar Software, Inc.

From the Battlefield to the Boardroom

by

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Who we are...

• Our Mission?
  – To make the world a better place through advanced Artificial Intelligence (AI)

• How do we do that?
  – Through the Cougaar Way: Architecture/Technology, Methodology, Tools, and Training/Education

• What do we provide?
  – Agent-based Decision Support Systems for AI-enhanced Operations, Logistics and Supervisory Control
What we do...

• Build custom decision support, planning and optimization systems based on intelligent agent technology
  – Intelligent
  – Distributed
  – Secure
  – Highly Automated
  – Adaptive
  – Scalable
Our Long Game Goal: AI

- AI has been heavy in the news lately, but what is it really?
- In general, its software that can do all of the following in a general way, not domain specific manner...

  - Pursue Goals
  - Reason
  - Plan
  - Communicate
  - Remember
  - Manage knowledge
  - Learn
  - Adapt
  - Monitor
  - Recognize patterns
  - Project future state

  - Develop expectations
  - Sched & allocate resources
  - Meta-plan
  - Collaborate / Share
  - Observe
  - Infer
  - Deduce
  - Hypothesize
  - Evaluate
  - Model
  - Discover new knowledge
  - Share / Acquire Behaviors

We have built systems with many of these features, but we have not yet matured to the point that all our systems routinely provide all of these features. When we do that for a domain, we will have maximized Narrow AI. When we do that for all domains...General AI
Multiple Approaches to AI

- **Symbolic**
  - Cognitive Simulation
  - Logic-Based
  - Knowledge-based

- **Bio-Inspired**
  - Neuromorphic
  - Neural Chips

- **Statistical / Probabilistic**
  - Bayesian Networks
  - Hidden Markov Models
  - Deep Learning

AI is the holy grail of IT, and many companies are pursuing it in many different ways. Even partial success yields value and new products/capabilities.

We are building Symbolic agents, leveraging neural and statistical/probabilistic techniques in agent behaviors as it makes sense for the problem they are solving.
AP Master Puzzle

Class V Adaptive Demand Estimation
• Predictive Analytics
• Dynamic Stockage Objectives
• Learned Consumption Rates

Marine Corps Adaptive Planning
+ New Plan Service
+ New Task Planner
+ New Inventory Viewer
+ Demand Estimation

Distribution & Retrograde APEX Management
+ Multi-Mode Trans Planning
+ Execution Monitoring
+ Personnel Scheduling
+ Route Definition

Automated Supply Point
+ Supervisory Control Capabilities
+ External Tasking / Resourcing
+ Physical System Integration (sensors / actuators)

Configure Load Builder Tool
+ Packing / Loading
+ Intel Convergence

Industrial Base Assessment Methods
+ SRF SC Supply Chain
+ Budget & Finance
+ Situational Viewer / Graph Viewer

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Digital Living Plan

• Captures mission Oplan content in a form that can be read by both humans and machines
  – **Who?** Force Structures (Friend, Foe, Coalition, etc.)
  – **What?** Activities assigned (Kinetic and non-kinetic)
  – **Where?** Geospatial location actual and relative to forces and targets
  – **When?** Timing & Synchronization
  – **Why?** Commander’s Intent & Mission Context
  – **How?** Resources (Equipment & Supply)

• Tied to Battlespace situation (objects, movements, pre- and post-conditions for actions)
Living Plan: Planning In Context

LIVING PLAN(S)

Plan
- Units
- Resources
- Tasks
- Goals

Commander’s Intent
- Locations
- Time

Context
- Rules
- Access
- Mission
- Constraints
- Forces
- Materiel
- Objectives
- Boundaries
- Timetables
- Partners

Situation
- Culture
- Religion
- Politics
- Resources
- Coalitions Position
- Infrastructure
- & Status
- Roads
- Power
- Comms
- Adversary Position
- & Status
Network: People and Systems
Innovation around human-systems collaboration, allowing a small number of people to manage many complex operations and monitor massive numbers of items and complex storages areas

- Leverages IoT, automation, robotics and decision support
- People manage by exception with alerting, analysis and recommendations
- Powerful and intuitive situational displays and decision support aid understanding
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