



# Everything is Alive Project

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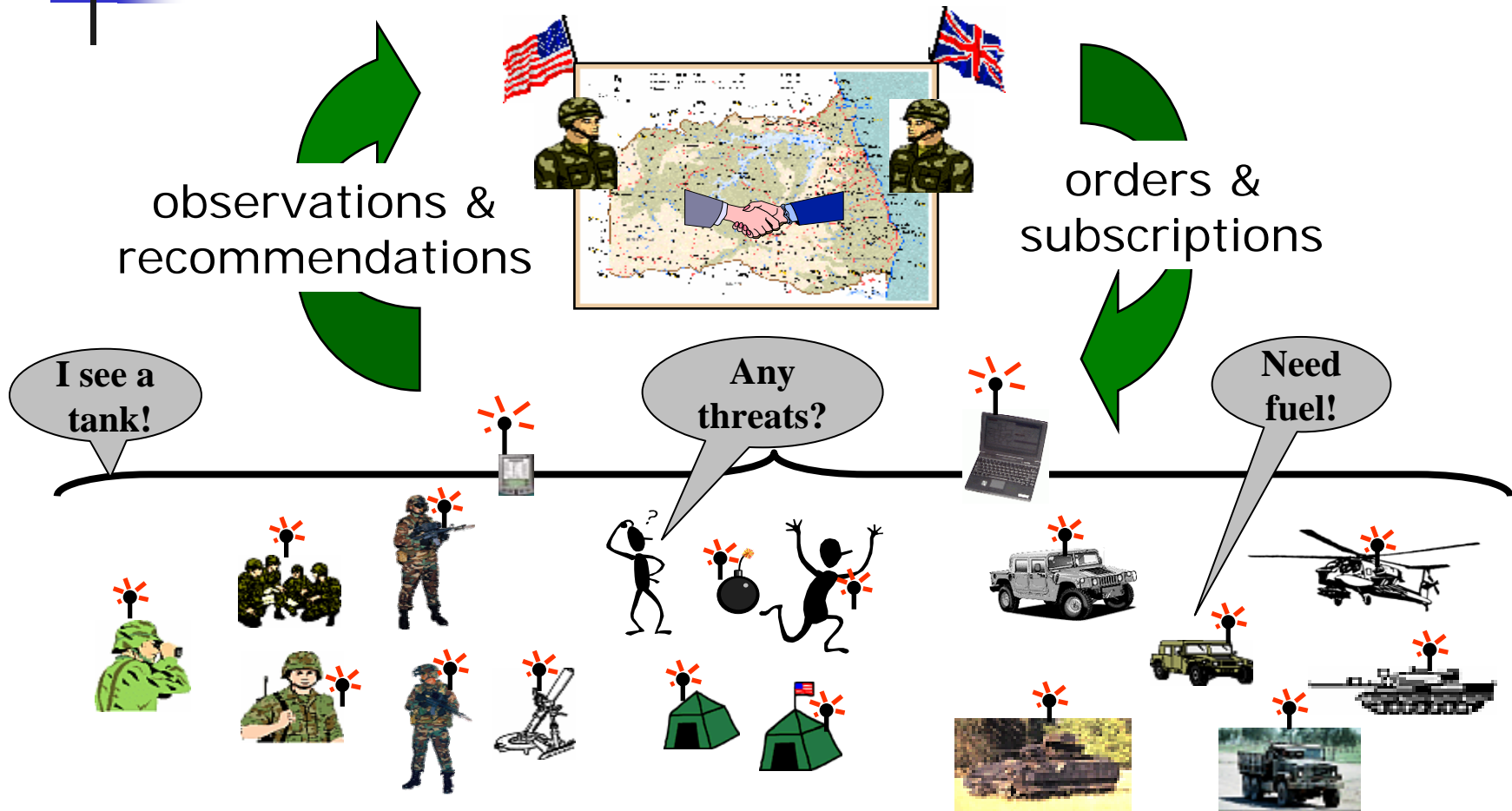
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**LANMAN, Princeton - June 11, 2007**

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# Everything is Alive



a world where everything can sense, act, think, feel, communicate, and maybe even move and reproduce. This might include equipment, vehicles, robots, toys, clothing, pets, and objects such as trees and walls.

# University of Arkansas RFID Research Center



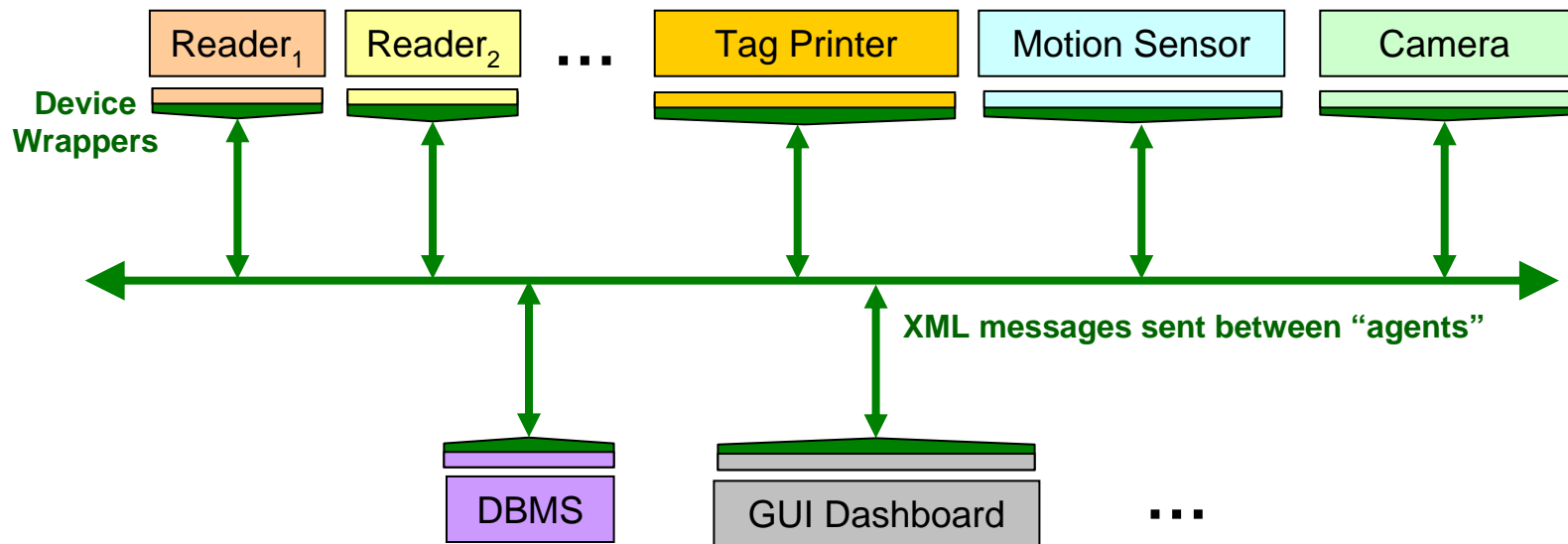
Fully student staffed with 24 industry members, which recently became the first open test laboratory to be accredited by EPCglobal Inc.



# University of Arkansas Center for Innovation in Healthcare Logistics

- Wal-Mart and Blue Cross Blue Shield funded center aimed at HC Logistics
  - Largest U.S. industry at 15% of GDP & rising
    - Growing at 3 times inflation due to aging population, epidemic of chronic disease, advances in powerful but expensive technology
    - Costs impacts every household, industry & level of government
  - Up to 30-40% waste, massive under-investment in IT, 90K annual deaths from preventable medical errors, 20% of tests lost & repeated, minimal continuity of care within the provider network, only half receive best-practice care, rampant perverse economic incentives,...

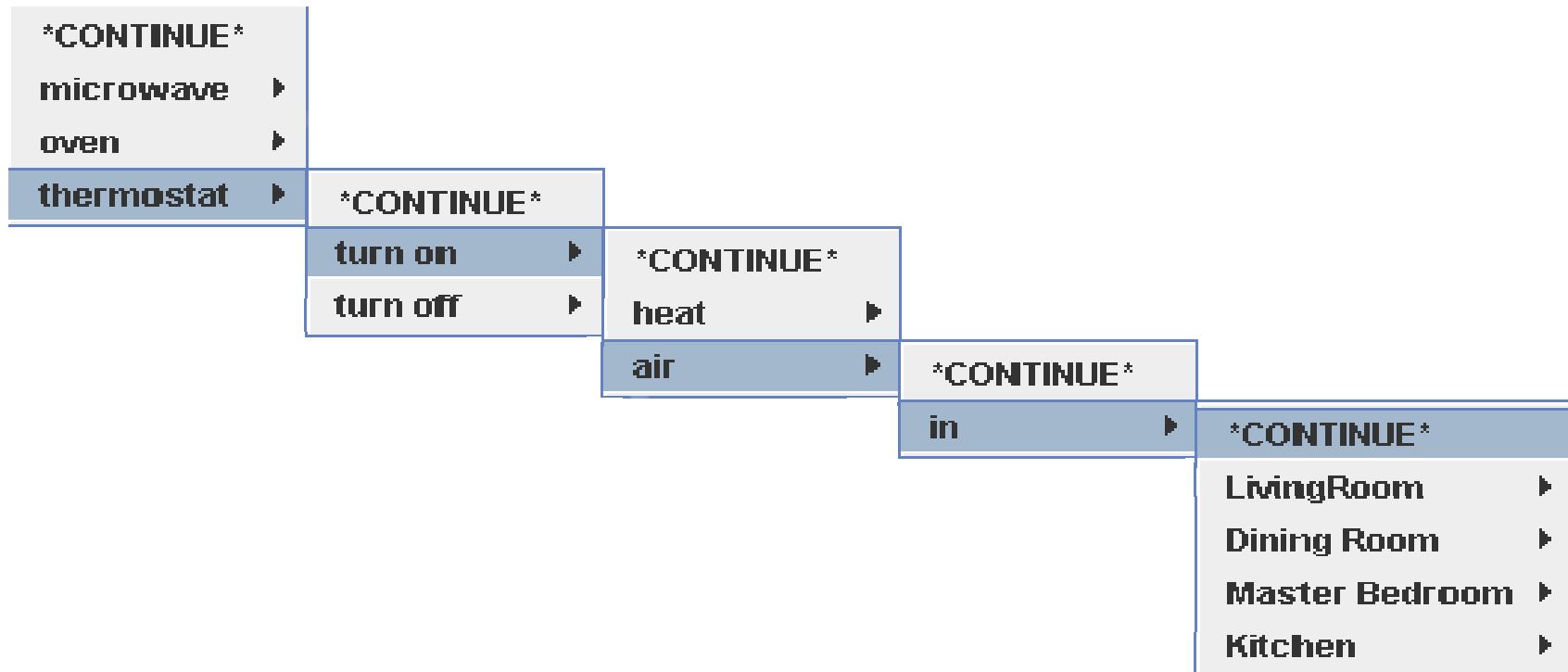
# TagCentric RFID Middleware



- Developed Ubiquity Agent System
- Developed TagCentric RFID application in Java
  - 4 reader types supported: Alien, Symbol, Thingmagic, and "Fake".
  - 1 Tag printer supported: Zebra
  - 5 databases supported: DB2, Derby, MySQL, Oracle, Postgres
- TagCentric Open Source Toolkit available on SourceForge
- Next Steps (end of summer; longer term)
  - Low Level Reader Protocol (LLRP) - Java library developed, TagCentric Agent in progress, Rafidi simulator in progress
  - Item Level RFID Asset Management for Apparel
  - TagCentric Scalability



# Soft Controller for Smart Device Menu Based Natural Language I/F Plugin



- Predictive menu to guide user to correct sentence



# Security Threats to Identity

STRIDE* Category	Threats
Spoofing	Cloning ID card, replay
Tampering with data	Change biometric, modify or delete database entry
Repudiation	Deny boarding plane
Information disclosure	Skimming ID card, eavesdropping ID card, information in database(s)
Denial of service	Jamming, access to database
Elevation of privilege	Upgrade privileges

\*M. Howard and D. LeBlanc, *Writing Secure Code*, 2nd ed., Redmond, Washington: Microsoft Press, 2003.



## Many Puzzles Remain

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- Item level Tagging
- Mobility
- Cold chain and sensors
- SNMP vs. XML
- Universal plug and play, composability & MDE
- Querying collections of agents
- Policy languages
- Security, visibility, digital rights for agents
- Simulation
- Open source