





PAL Boot Camp:

Acquiring, Training, and Deploying Systems with Learning Technology

Doug Lange

Command and Control Technology and Experimentation Division







- PAL Program Overview
- Problem Definition: How do cognitive systems break the systems engineering paradigm.
- The Boot Camp Experiment
- A Generalization of the Boot Camp Process.
- Measurement in Support of the Boot Camp





The IPTO Approach Develop Cognitive Systems: Systems that know what they're doing

- A cognitive system is one that
 - can reason, using substantial amounts of appropriately represented knowledge
 - can learn from its experience so that it performs better tomorrow than it did today
 - can explain itself and be told what to do
 - can be aware of its own capabilities and reflect on its own behavior
 - can respond robustly to surprise



Personalized Assistant that Learns





The Virtual Executive Assistant

Responds to user's advice

Learns to anticipate user's

Observes user's actions Learns user's preferences

Learns new tasks

information needs

- Development of a complete cognitive system
- Development and integration of multiple AI technologies
- Creation of an integrated learning assistant



Two Efforts: CALO (SRI) and RADAR (CMU)





Problem Definition

- PROBLEM 1: WHEN IS A PAL READY TO BE FIELDED?
- PROBLEM 2: WHAT MUST A PAL KNOW IN ORDER TO LEARN CAPABILITIES IN THE FIELD?
- PROBLEM 3: CAN A PAL GO THROUGH SYSTEMATIC TRAINING AND HOW WOULD WE MEASURE THE RESULTS?
- PROBLEM 4: CAN WE IDENTIFY THE CORE KNOWLEDGE NECESSARY TO A PAL?





Representative Situations for Efficiency









Boot Camp Simulation



- Randomly generate environment models that model available tasks, methods, concepts, and a set of operations
- Generate agent models that represent different states of training
- Utilize human strategies observed and postulated to determine results in effectiveness and efficiency.







Comparing Simulation to Human Use Experiment

- Utilize Command World Scenario and Task Model
- Small Number of Repetitions – Just Enough to Gain/Lose Confidence in Simulation Results





Boot Camp Process







The Navy's Center of Excellence for C4ISR



Space and Naval Warfare Systems Center San Diego, California 92152-5001