

# IST and METIL Overview

UNIVERSITY OF CENTRAL FLORIDA



**INSTITUTE for  
SIMULATION  
& TRAINING**®

David Metcalf, Ph.D.



# Report Documentation Page

Form Approved  
OMB No. 0704-0188

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|   |                     |                     |                             |   |                                 |
|---|---------------------|---------------------|-----------------------------|---|---------------------------------|
| 1. REPORT DATE<br><b>12 AUG 2010</b>  |                     | 2. REPORT TYPE      |                             | 3. DATES COVERED<br><b>00-00-2010 to 00-00-2010</b> |                                 |
| 4. TITLE AND SUBTITLE<br><b>IST and METIL Overview</b>  |                     |                     |                             | 5a. CONTRACT NUMBER                                 |                                 |
|   |                     |                     |                             | 5b. GRANT NUMBER                                    |                                 |
|   |                     |                     |                             | 5c. PROGRAM ELEMENT NUMBER                          |                                 |
| 6. AUTHOR(S)  |                     |                     |                             | 5d. PROJECT NUMBER                                  |                                 |
|   |                     |                     |                             | 5e. TASK NUMBER                                     |                                 |
|   |                     |                     |                             | 5f. WORK UNIT NUMBER                                |                                 |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br><b>University of Central Florida, Institute for Simulation &amp; Training, Orlando, FL, 32816</b> |                     |                     |                             | 8. PERFORMING ORGANIZATION REPORT NUMBER            |                                 |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)   |                     |                     |                             | 10. SPONSOR/MONITOR'S ACRONYM(S)                    |                                 |
|   |                     |                     |                             | 11. SPONSOR/MONITOR'S REPORT NUMBER(S)              |                                 |
| 12. DISTRIBUTION/AVAILABILITY STATEMENT<br><b>Approved for public release; distribution unlimited</b>   |                     |                     |                             |   |                                 |
| 13. SUPPLEMENTARY NOTES<br><b>Implementation Fest 2010, 10-12 Aug 2010. U.S. Government or Federal Rights License</b>                                   |                     |                     |                             |   |                                 |
| 14. ABSTRACT  |                     |                     |                             |   |                                 |
| 15. SUBJECT TERMS   |                     |                     |                             |   |                                 |
| 16. SECURITY CLASSIFICATION OF:   |                     |                     | 17. LIMITATION OF ABSTRACT  | 18. NUMBER OF PAGES                                 | 19a. NAME OF RESPONSIBLE PERSON |
| a. REPORT   | b. ABSTRACT         | c. THIS PAGE        |                             |   |                                 |
| <b>unclassified</b>   | <b>unclassified</b> | <b>unclassified</b> | <b>Same as Report (SAR)</b> | <b>48</b>   |                                 |



# Topics

- Background and UCF/IST Overview
- METIL Mission
  - Research Disciplines
  - Partners/Sponsors
  - Markets Impacted
- Select Projects
- Future Goals and Needs



# The University of Central Florida



- Orlando, FL
- 3<sup>rd</sup> largest University in U.S.
- 2<sup>nd</sup> highest number of CS graduates
- 2009-10 enrollment exceeds 53,000 (8/30/09)
- 12 Colleges
- 68 degree programs

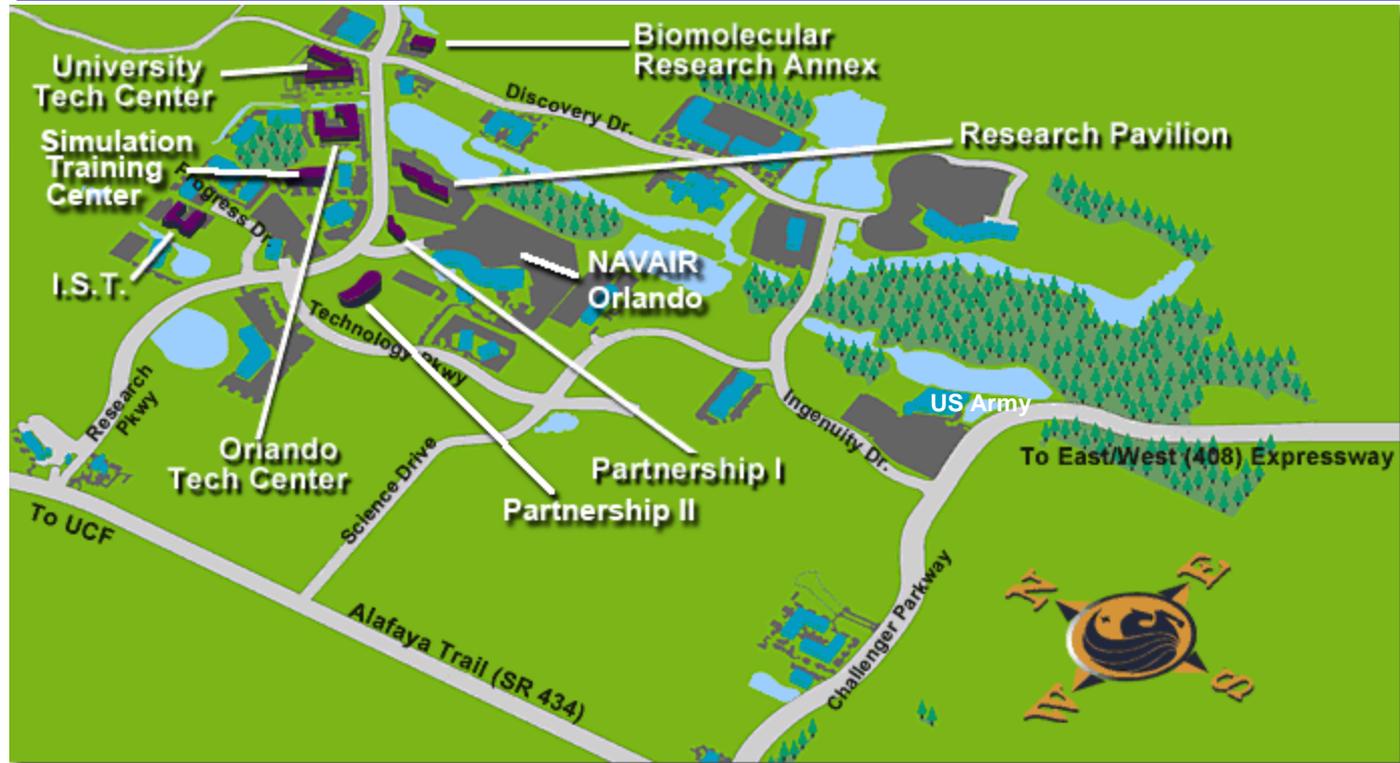
## The Institute for Simulation and Training

is a Research Institute reporting to the Vice President for Research

# Some Partners in the Community



# Central Florida Research Park



Among the nation's top 10

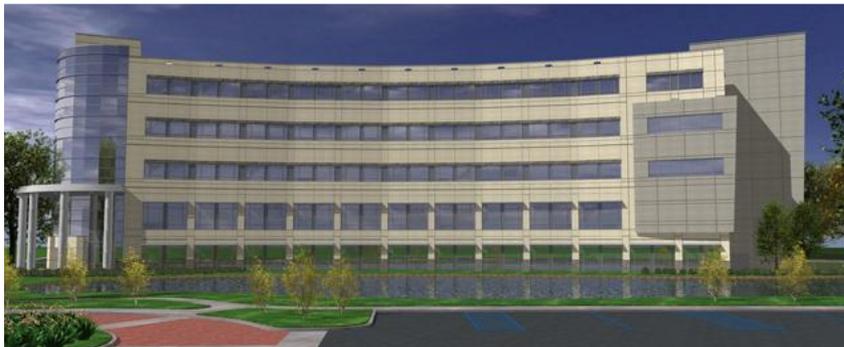
**\$5.12 Billion in Training and Simulation flows through Central Florida with the Research Park the Hub**

# IST Vision

Be...

**the premier academic research organization internationally recognized for**

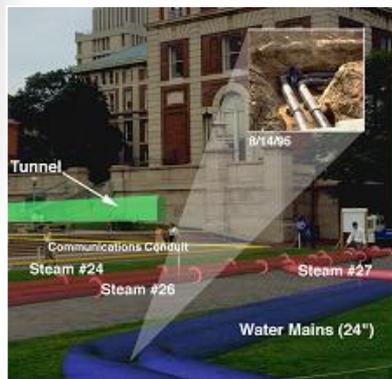
- **creative interdisciplinary contributions to the art and science of human-centric simulation.**



# Institute for Simulation & Training

## Capabilities

Multi-Resolution Simulation  
High-Level Architecture  
Connectivity  
Computer Generated Forces  
Virtual Environments  
Computer Graphics  
Terrain Databases  
Low-Cost Graphics  
Training & Education  
New Simulation Environments  
Medicine  
Public Safety  
Information Technology





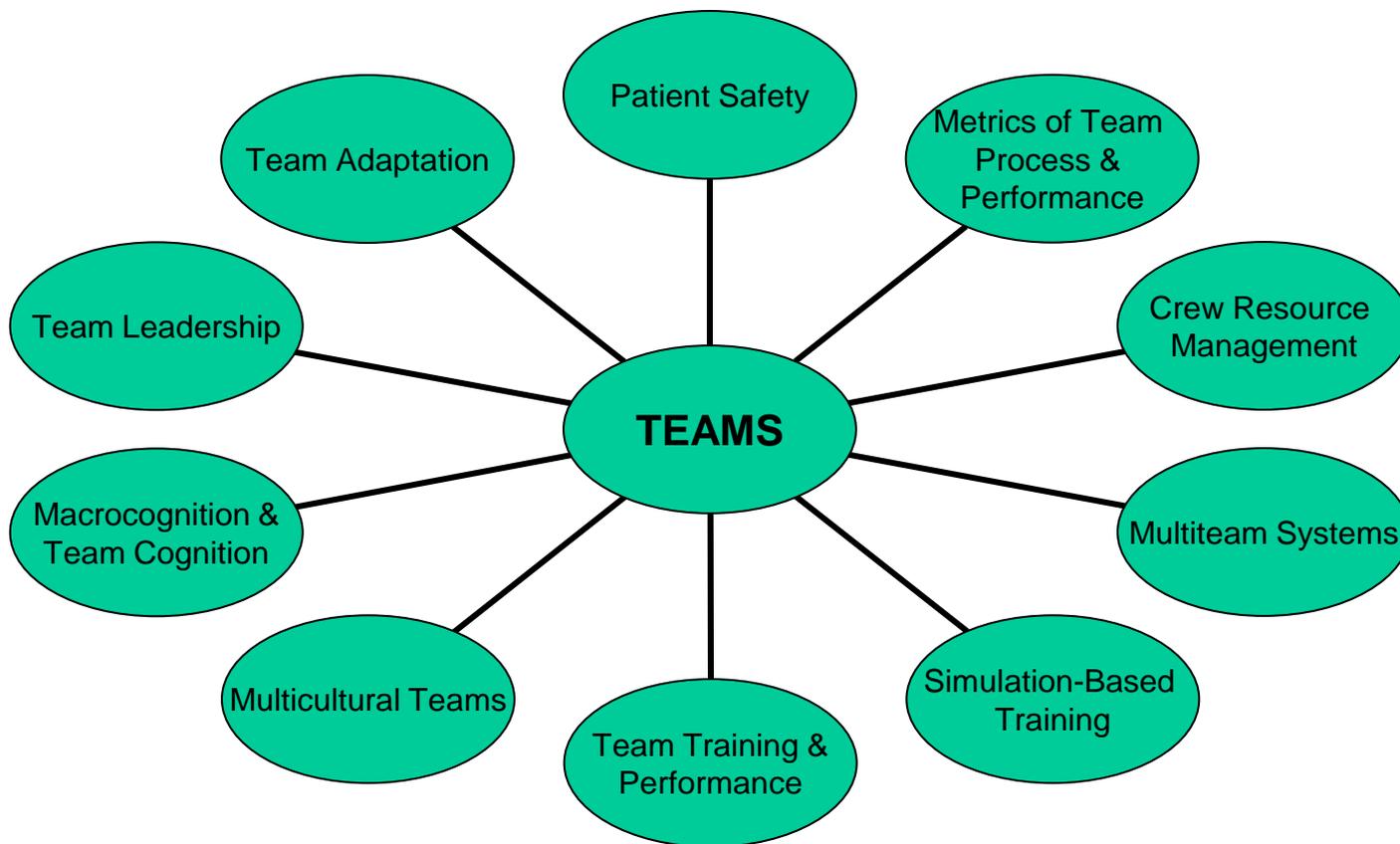
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# A Sampling of Current Research Programs & Laboratory Activities

# Human Systems Integration Research

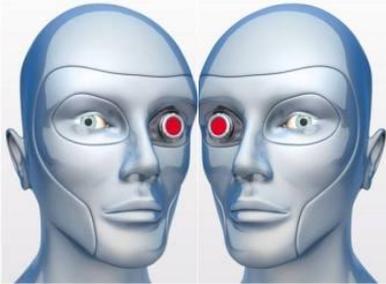
*Maximizing human performance in complex environments through a team-centered approach to training, learning, and assessment.*

## Areas of Expertise



# Cognitive Sciences Laboratory

Explores how elements internal and external to the mind are integrated, how they work and how cognitive systems can be improved. IST & Dept. of Philosophy collaboration.



Examine cognition and coordination in human-agent teams.

**Funding:** ARL

**Partner:** Computer Science



Develop cross-disciplinary theories to enhance research in team cognition and coordination.

**Funding:** ONR

**Partner:** Psychology

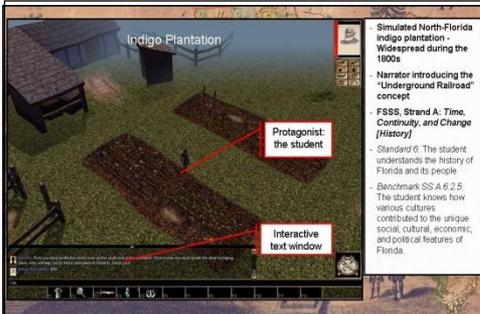


Improve training systems to accelerate the development of perceptual expertise for X-ray security screeners.

**Funding:** DHS

**Partner:** Psychology

*Cognitive Science examines such phenomena by drawing on a variety of disciplines, including psychology, computer science, philosophy, neuroscience, modeling and simulation, linguistics and anthropology.*



Develop games to augment humanities education.

**Funding:** UCF

**Partner:** Digital Media



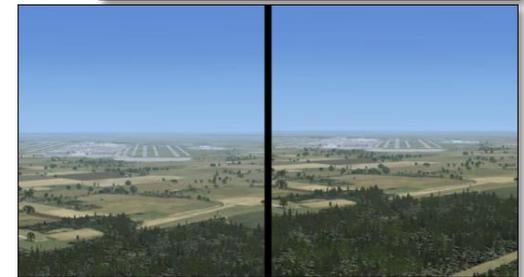
Examine how simulation tools may improve understanding in environmental economics.

**Funding:** NSF

**Partner:** Economics and Computer Science

# Team Performance Laboratory

- ◆ Director: Florian Jentsch, Ph.D.
- ◆ Mission: to develop and test theory and methods from the psychological, organizational, and computational sciences in the study of individual and team process and performance.
- ◆ Current research projects
  - **DHS Transportation Security Laboratory (TSL)**
    - X-Ray baggage screening training (cues, trng env., field studies)
  - **Federal Aviation Administration (FAA)**
    - Aviation training research (scenario gen & knowledge assessment tools for various avn events)
  - **Army Research Laboratory (ARL) and RDECOM**
    - Human-Agent Team research (route planning, target detection using scale MOUT facility & virtual foxhole)



# RETRO Laboratory



*Route Planner Minigame*  
Funded by: The Robert Wood Johnson Foundation



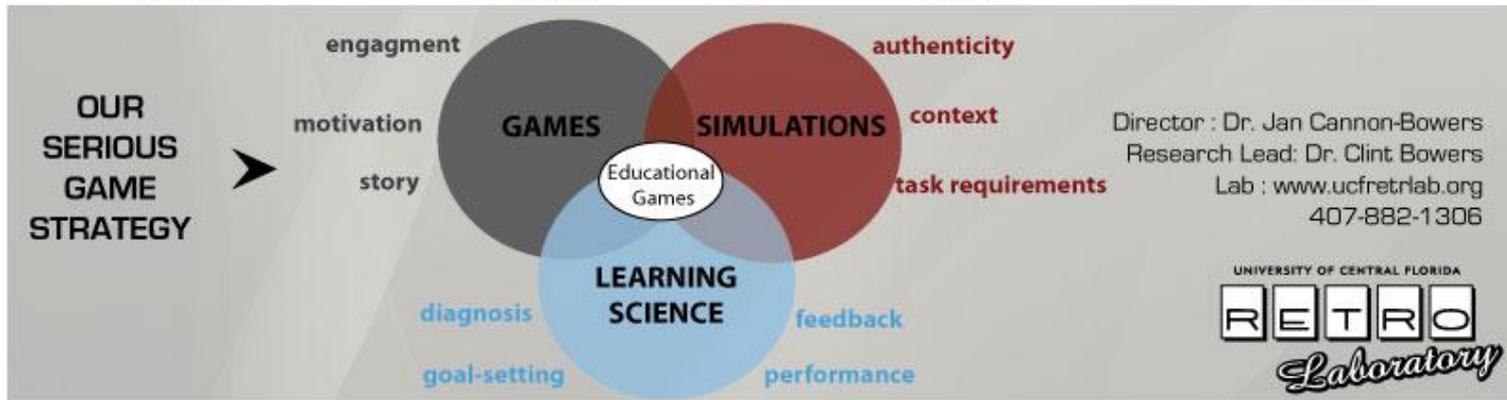
*Clean House Minigame*  
Funded by: The Robert Wood Johnson Foundation



*Flood Control Sim Cinematic*  
Funded by: The Office of Naval Research



*Testing @ NSTC Great Lakes, IL*  
Funded by: The Office of Naval Research



*Lunar Quest MMOG*  
Funded by: The National Science Foundation



*Plant Harvesting Minigame-Parabolic Motion*  
Funded by: The National Science Foundation



*Insignia Searcher Minigame*  
Funded by: The Office of Naval Research



*Lunar Quest MMOG In-Game Play*  
Funded by: The National Science Foundation



# Current Research on Stokes

## IST

- ◆ Investigating strategies for Mapping MMOG onto Stokes.
- ◆ Crowd Modeling and Semi-automated Force (SAF).
- ◆ Computational Steering and Visualization.

## Civil Engineering

- ◆ Coastal Modeling to bBetter Predict Tidal Conditions.

## Physics

- ◆ Theoretical and Computational Modeling of Materials.

## Nanoscience

- ◆ Computer-assisted Design of Non-linear Optical Materials with Applications Including Three Dimensional Data Storage.

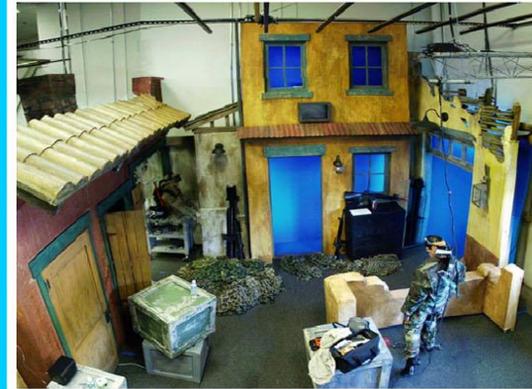


## Future M&S Research

- ◆ New M&S Computing Arch.
- ◆ Augmented Cognition
- ◆ M&S Interoperability

Approaches

# Mixed Reality Facility



# Cognitive Rehabilitation Experiment



# ACTIVE\* Laboratory



## \*Applied Cognition and Training in Immersive Virtual Environments

The **ACTIVE Lab** engages in applied research and development for the analysis and improvement of human performance. Our multidisciplinary team of more than 30 researchers is organized into focus area teams:

- ❖ Simulation Based Learning
- ❖ Adaptive Interaction
- ❖ Operational Neurosensing
- ❖ Human Robotics Interaction
- ❖ Social Cultural Behavior Modeling

Provide Content & Information to Stimulate the Senses



Measure & Model the human's "state"

Adapt processing & interfaces based on the human's "state"

**Merging virtual reality and neuroscience to advance the state of the art in human training**

# Mixed Emerging Technology Integration Lab (METIL)

## Go for the Green

Mobile learning sales game with a golf theme on iPhone, Blackberry, Symbian and Windows Mobile



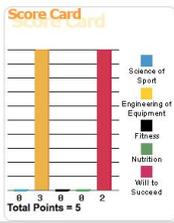
## Mobile My Sports Pulse Challenge

Mobile Simulations for Science, Technology, Engineering and Math (STEM) Education



Title: Amateur  
School:  
Jersey #: 5100286

- Settings
- Change My Avatar
- Change Password
- Refer a Friend



Innovative integration of 3 domains:

**STEM Education** to improve students interest and future technical entrepreneurship opportunities

**Sports Theme** to expand audience, promote interest and provide extrinsic motivation

**Mobile Technology** for delivery to a young, broad audience, reaching millions internationally



## Microsoft Mobile SCORM-conforming courses

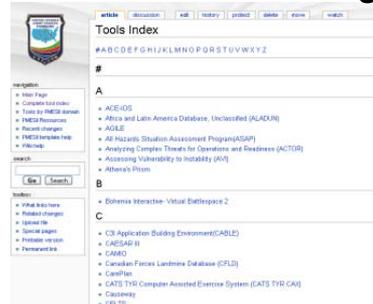


Learning, Knowledge & Cognition

# Mobile

Games and Simulations  
Virtual Worlds  
Collaborative Technologies  
Web 2.0 and beyond

## PMESII Catalog



Community-editable database wiki for irregular warfare simulations



DAU Sim Cards  
Classroom, Online, Mobile and Virtual World Learning Scenarios

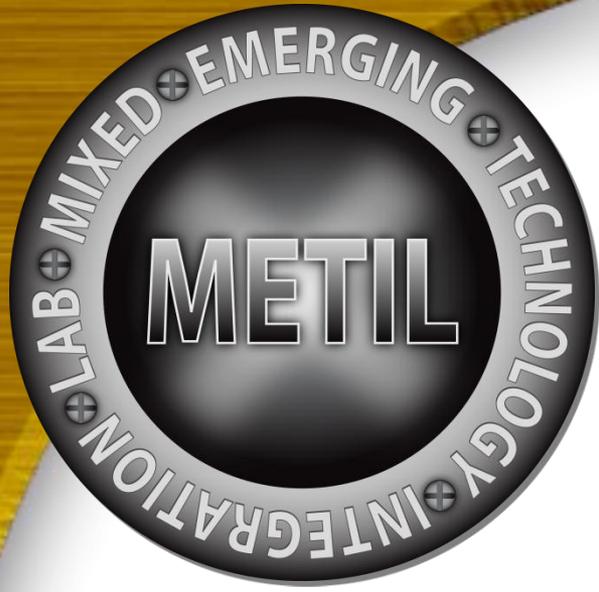


## Johnson & Johnson PRD 3D University



Corporate Mobile Learning, Virtual Worlds and KM/Collab



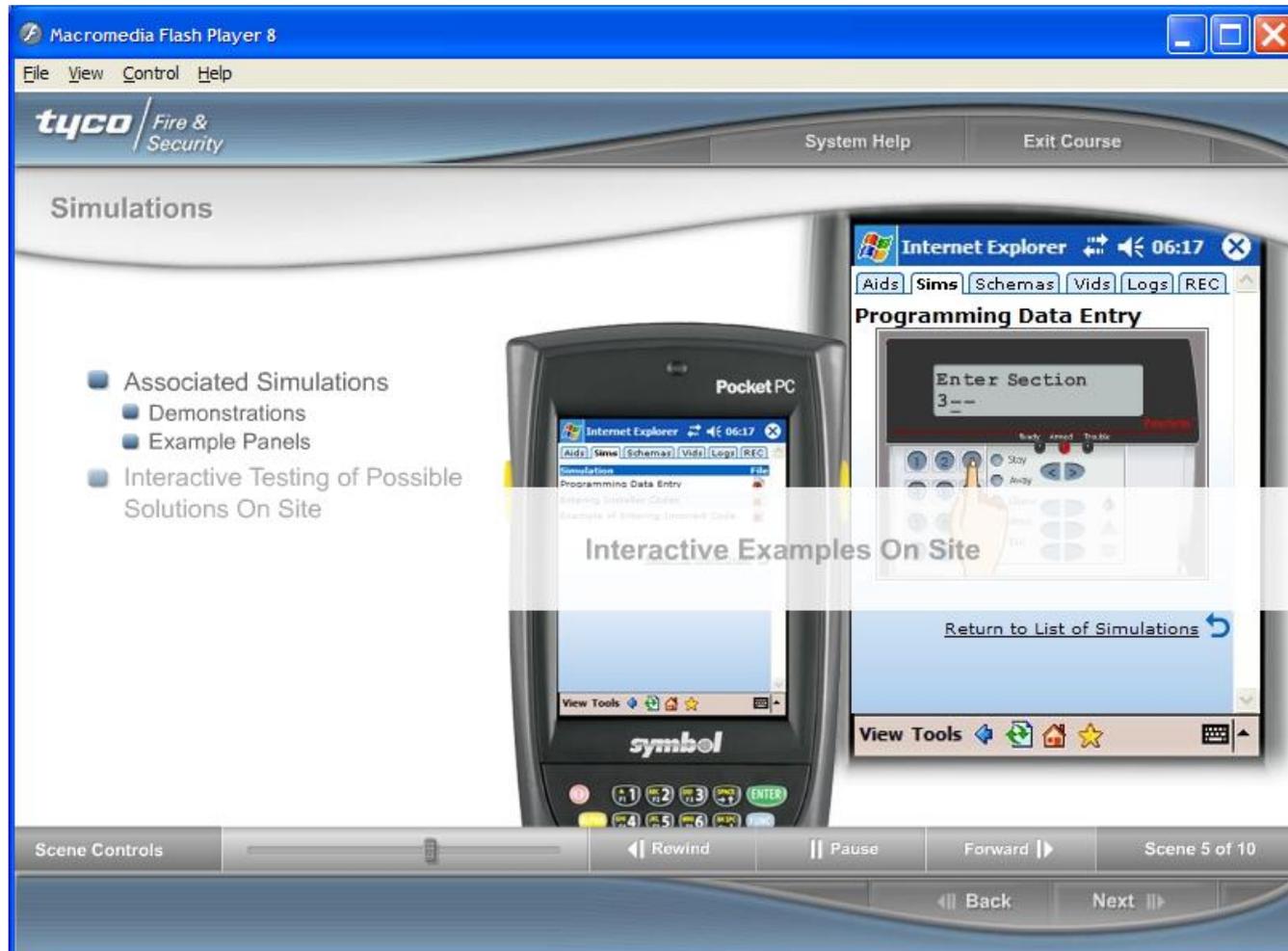


# Example Projects



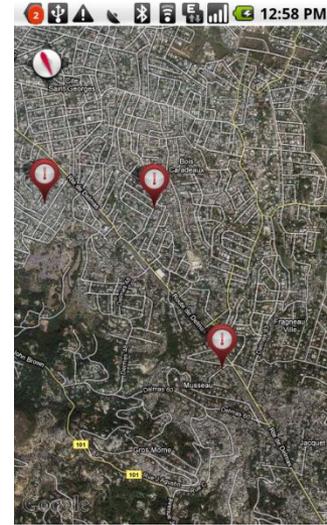
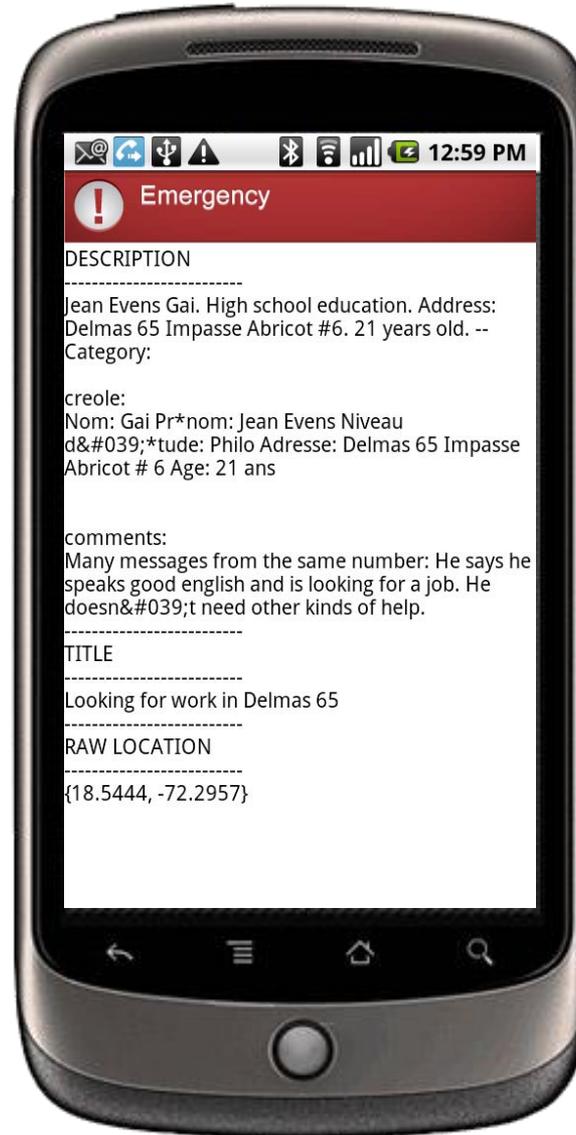
# Tyco Phase IV

- Mobile Performance Support, over 5000 devices
- Audio Podcast access
- Blackberry Pilot





# Aid Tracker: Haiti Relief



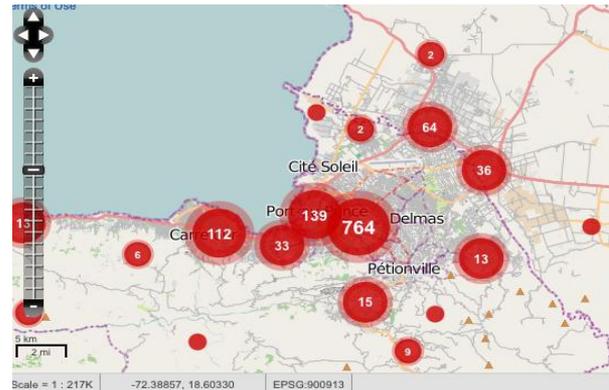
- Aid needed - Rue Magasin de l'etat, Continue, Portail Leogane
- Aid needed - Santo 19 #7, Croix-des-Bouquets
- Medical assistance needed for sick child - Gonaives
- Food needed - Thomazeau
- Aid needed - Brochette 99
- Food/Water and Tents needed - Delmas 75, Rue Berenice
- Food, Water and Shelter needed - Village Canaan # 19.
- Food/Water and Sanitation

ONR request and NSF assessment funding



# Haiti and Kenya

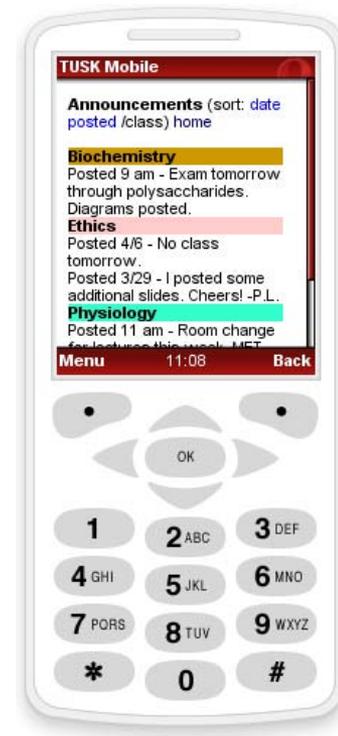
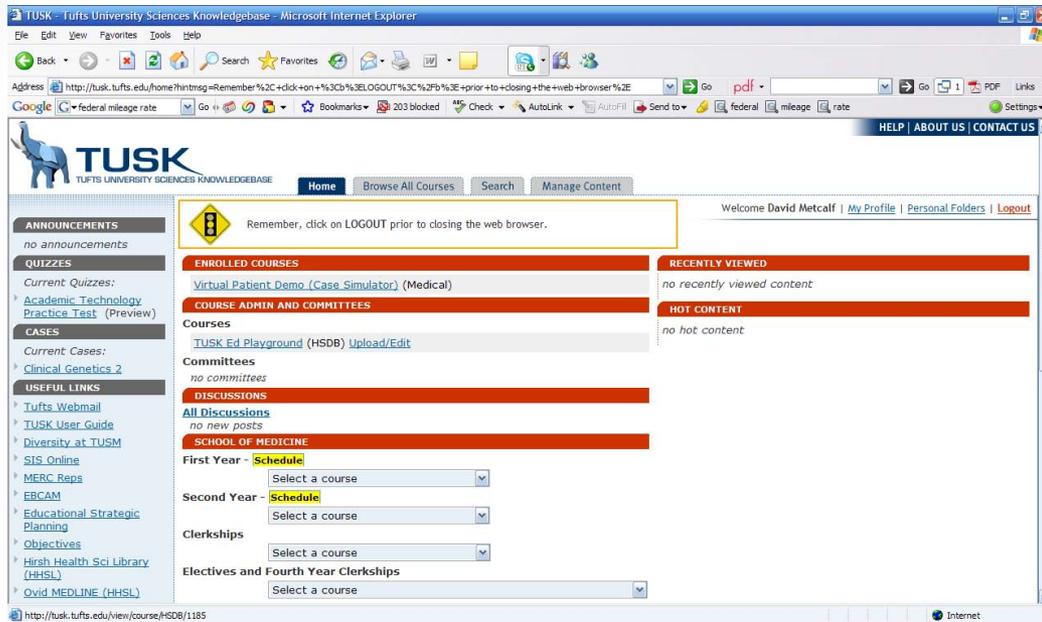
- Mobile Aid Tracker for Android, supplies and Combat medic trainer cards being deployed



- Raytheon sponsored project for mobile banking, healthcare and education in Kenya Summer 2010

# Tufts University

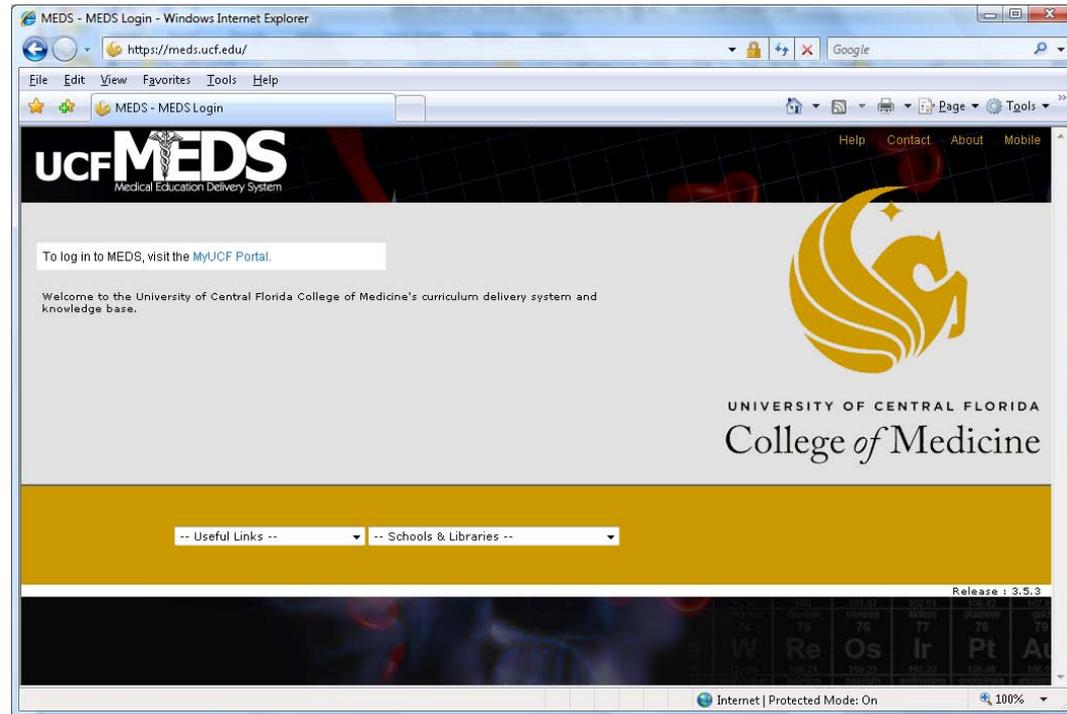
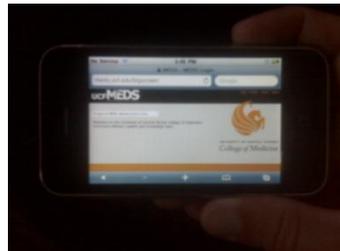
- Mobile access to TUSK, Tufts University Science Knowledgebase in developing nations of East Africa and India





# UCF College of Medicine

- IT, Simulation and Mobile integration and development for 2009 launch



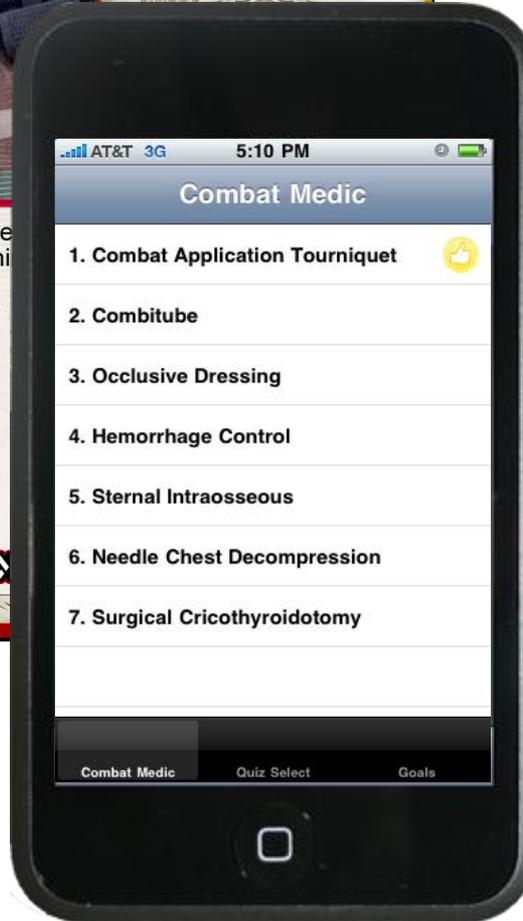
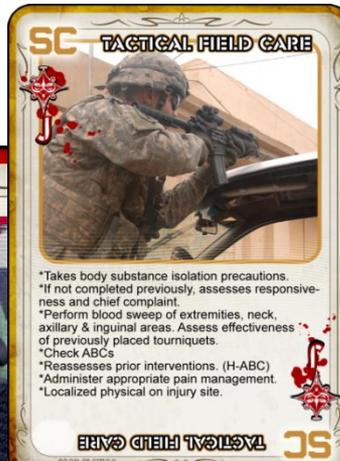


# Combat Medic Card Games

- Research project on card games to reinforce learning for life saving procedures
- Four customized versions of standard games
  - Solitaire (Cruel)
  - Rummy
  - **King's Corners**
  - Nertz
- Cards also usable as flash cards or regular deck
- Flexible framework & ease of production means easy expansion to other audiences



# Combat Medic Card Games





# Mobile Interval Spacing Algorithm

9:48 AM No Service

Quiz Select Today's Questions

Today's Questions

This quiz includes all the questions you have scheduled to study today. You have 41 questions left to study.

Review

This quiz allows you to review questions you have studied recently. You have 31 questions you can review.

View History

Surgical Cricothyroidotomy Step #1

Touch for answer

SC CONDITION

10

- An unconscious casualty has an upper airway obstruction. The casualty's airway cannot be opened using manual methods or supraglottic airway devices
- Necessary materials and equipment: cutting instrument (scalpel), alcohol pad, endotracheal tube (minimum lumen width of 6.0 mm), stethoscope, exam gloves, and a size 8

Red thumbs down, orange thumbs up, yellow thumbs up, green thumbs up

9:46 AM 9:48 AM 9:49 AM

Combat Application... Quiz Select History Goals

CAT TACTICAL FIELD CARE

- Take body substance isolation precautions
- If not completed previously, assess responsiveness
- Perform blood sweep of extremities, neck, axillary & inguinal areas. Assess effectiveness of previously placed tourniquets
- Check ABCs
- Reassess prior interventions (H-ABC)
- Localized physical on injury site

Day 31 (Feb 25, 2010)

Day 24 (Feb 18, 2010)

Day 18 (Feb 12, 2010)

Day 10 (Feb 4, 2010)

Day 7 (Feb 1, 2010)

Day 2 (Jan 27, 2010)

Day 1 (Jan 26, 2010)

4 weeks remaining

You should review week 1

Days Remaining 44

| Day | Frequency (0-100) |
|-----|-------------------|
| 1   | 75                |
| 2   | 45                |
| 3   | 40                |
| 4   | 65                |
| 5   | 0                 |
| 6   | 0                 |
| 7   | 0                 |
| 8   | 0                 |
| 9   | 0                 |
| 10  | 0                 |

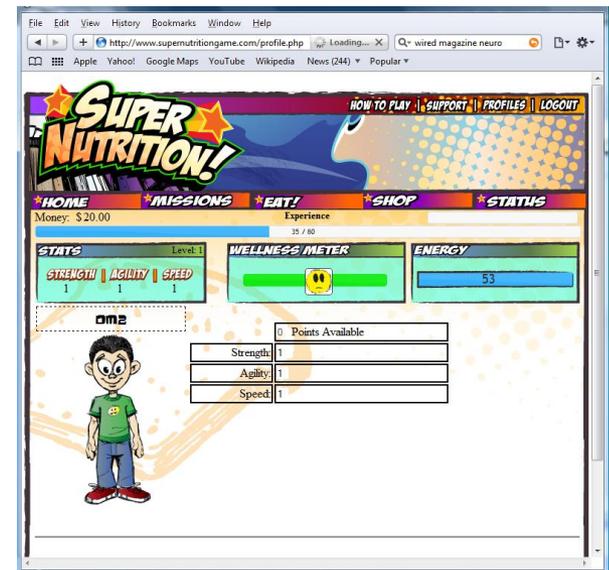


# COMBAT HUNTER





- Facebook-style mobile social game
  - Multiplayer
  - Multiplatform
- Teaches the new FDA food pyramid through eating for energy to perform missions that can get you enrolled in Superhero school
  - Target 9-12 yr olds





# Mobile MySportsPulse

- Science and Math education combined with sports through mobile learning
- Can be done through SMS, IVR, email or web browser
  - Voice recording or video from sports celebrities
  - Answer sent back and scored by automated system
  - **Timed intervals that have been proven to produce learning outcomes and reinforcement**

**Title:** Amateur  
**School:**  
**Jersey #:** 5100286

**Settings**

- [Change My Avatar](#)
- [Change Password](#)
- [Refer a Friend](#)

**Score Card**

| Category                 | Score    |
|--------------------------|----------|
| Science of Sport         | 3        |
| Engineering of Equipment | 0        |
| Fitness                  | 0        |
| Nutrition                | 0        |
| Will to Succeed          | 2        |
| <b>Total Points</b>      | <b>5</b> |

**MYSPORTSPULSE™**

Home | General Information | Contact Us | FAQs

search. [GO] browse

My Sports Pulse

**The Challenge**

There is a documented worldwide shortage of science, technology, engineering and mathematics (STEM) students in undergraduate and graduate programs who can meet and fulfill the standards of mathematics courses.

**The Concept**

Innovative integration of three domains:

- STEM Education to improve students' interest and future technical entrepreneurship opportunities;
- Sports Theme to expand audience, promote interest and provide extrinsic motivation; and
- Mobile Technology for delivery to a young, broad audience, reaching millions internationally.

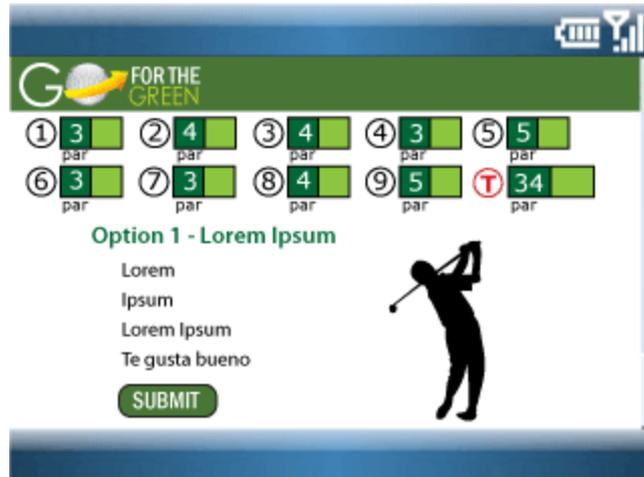
**Contributing Organizations**

Founded in 1962 as a research unit of the University of Central Florida, IST provides a wide range of research and information services for the modeling, simulation and training community. IST also has a long history of providing the military with technology for simulating work processes, particularly in high stress situations, along with other integrated learning technologies. Complementing this expertise is the university's award-winning Technology Incubator (UCFTI).

[Read more...](#)

# Golf-themed Mobile Sales Game

- Learning game for sales people with a 9 step process themed around golf.



Runs from the same code on Windows Mobile, iPhone, Blackberry, Symbian, Palm, etc.

# Johnson & Johnson PRD 3D University



# J&J University Mobile Initiatives

- Blackberry pilot- with RIM's newly acquired Digital Chalk division
  - Blackberries issued to Senior Directors and above
  - Variety of offerings in School of Professional and Personal Development

Other pilots in review on standard mobile phones using messaging (email, text messaging and voice messaging) with UCF tools



# Online and Mobile Phase II- Card Sim

The online Flash component of the card game simulation will allow players from various DAU sites to participate in a real-time multiplayer game. Each player will have a laptop and control his or her cards through the Flash user-interface. Communication between sites for player interaction and instructor moderation might be accomplished through VoIP or by utilizing video conferencing equipment in a high-tech simulation facility.

**DAU**

**Joint Unmanned Robotic Device (JURD) - Environmental Risk**

**Scene**

The program office could transfer the risk to the users and let them determine how to ensure the system will meet compliance requirements after delivery. They may be able to negotiate with the regulators or perform trade-offs with other emissions generated at their installations. However, a threshold requirement is a threshold requirement and not for the program office to debate the user's requirement. Moreover, there is a risk to the program that the current threshold emission requirement will not be acceptable by the time the system is fielded.

The best way to handle this risk is to try to control it. The ACTD project office might be able offer some assistance on the new technology with the development of their unmanned robotic system, then incorporate the new propulsion technology prior to low rate initial production.

**Solutions:**

Option 1: Hold a meeting with the PM and major stakeholders to discuss that there is likely to be a failure to meet a threshold requirement and to plan for a program reevaluation.

Option 2: Coordinate with the user to clarify the requirement. Once clarified, reassess the risk in terms of probability and consequence.

Option 3: Approach the ACTD program to integrate the JURD system performance requirements into their existing program.

**3 2 JURD Environmental Risk**

**Current Role: Program Management** Level: ★★★

**Jeremy:** This is what Jeremy's text might look when he is talk to other players on the screen. It will look different to him to know it's his.

**David:** This is what David's text will look like when he is typing a message to another person.

**Danielle:** This is what Danielle's text might look.

This is what text will look like. **SEND**



**Scenario My Cards Others' Cards Obstacles Chat**

Experience Name Goes Here

Ut rutrum arma quis velit. Marcenas id tortor. Donec a ligula. Nam tincidunt velit at libero. Sed id sapien. Proin eu dui. Nulla feles. Aliquam ante. Donec quam. Namis semper, piam dapibus. nismod tristique, musis dicit. Ina illas libero, id tempus feles. orci at justo. Suspendisse massa nulla, tempus quis, gravida vel, elementum rhoncus, ipsum.

**OBSTACLE**



# Virtual Worlds Integration

Second Life  
File Edit View World Tools Help Fiddlers Green 98, 186, 48 (Mature) - !Black Ops Guns! 9:48 PM PDT L\$224

David2 McMahon

You: CASSANDRA – Card-Based Version (UCF IST) The DAU card game simulation allows up to six players to navigate their way through the defense acquisition process, encountering and overcoming obstacles along the way. Players will be arranged around a table with the card game in the center. Each player will take on a role (Program Manager; Business, Cost Estimating, and Financial Planning; Contracting; Test and Evaluation; Lifecycle Logistics; Systems Planning, Research, Development, and Engineering). The role card determines what kinds of actions each player will be able to take during gameplay. For games with less than six players, one or more members of the team will take on an additional role. The instructor will read aloud one of the scenario cards. Once the team is aware of the problem, they will decide on a possible solution, find out what they need to get there, and work towards that goal. They will be dealt five cards each. If they receive a red obstacle card, they will move the card to the center of t

History IM Chat Friends Stop Flying Snapshot Search Build Mini-Map Map Inventory Say Shout Gestures



# Integrating Web and Mobile Scenarios into Virtual Worlds

The screenshot shows a virtual marketplace stall in Second Life. The stall is a grey wall with various signs and items. At the top, a sign reads "FOR ELITE USERS". Below it, there are signs for "WEAPONS" and "UNIFORMS". A central sign lists "Category: Misc", "F117A Stealth Fighter V1.0", and "Pay L\$1200 to buy this item". To the right, a sign says "MISC. FANTASY COLLECTION". Further right, there are signs for "F117A STEALTH FIGHTER", "HL2 EXPLOSIVE BARREL", "KA-BAR", "R/C RAPTOR", "R/C KICKFLARE", "L4MAG SILVER NECKLACE", and "L4MAG GOLD NECKLACE". A large sign in the center features a stealth bomber and text: "BLACK OPS PRESENTS F117A STEALTH FIGHTER FEATURES", "MOD COPY NO TRANS", and "David2 McMahon". A character in a blue shirt is seen from behind, looking at the stall. On the right, a character in a military uniform is visible. The interface includes a menu bar (File, Edit, View, World, Tools, Help), a chat window at the bottom with a history of messages, and a mini-map in the top right corner.

Second Life  
File Edit View World Tools Help Fiddlers Green 44, 203, 36 (Mature) - !Black Ops Guns!  
10:02 PM PDT L\$224

FOR ELITE USERS

WEAPONS  
UNIFORMS

Category: Misc  
F117A Stealth Fighter V1.0  
Pay L\$1200 to buy this item  
Touch for item notecard

MISC.  
FANTASY COLLECTION

F117A STEALTH FIGHTER  
HL2 EXPLOSIVE BARREL  
KA-BAR  
R/C RAPTOR  
R/C KICKFLARE  
L4MAG SILVER NECKLACE  
L4MAG GOLD NECKLACE

David2 McMahon

BLACK OPS PRESENTS F117A STEALTH FIGHTER FEATURES  
MOD COPY NO TRANS

Chat History  
Chat Mute Fiddlers Green 43,202,38 (object) Show Muted Text

[21:55] Fiddlers Green 43,202,38: Contacting server for notecard...  
[21:55] Black Ops Item Server owned by Grey Blankes gave you 'DCUPATNOTE' ( <http://slurl.com/secondlife/Fiddlers%20Green/169/227/700> ).  
[21:55] You decline 'DCUPATNOTE' ( <http://slurl.com/secondlife/Fiddlers%20Green/169/227/700> ) from Black Ops Item Server.  
[21:56] Fiddlers Green 43,202,38: Contacting server for notecard...  
[21:56] Black Ops Item Server owned by Grey Blankes gave you 'AUSCAMNOTE' ( <http://slurl.com/secondlife/Fiddlers%20Green/169/227/700> ).  
[22:01] You: In this scenario, you must purchase 400 F117A's and deliver them to 12 locations within the allotted time. Contracting for lower prices, logistics for delivery, and test and evaluation will all be monitored by an internal reviewer. Your actions will be recorded via an internal AAR feature.

History Click here to chat.

IM Chat Friends Fly Snapshot Search Build Mini-Map Map Inventory

# DAU Telepresence Study

- Comparison of the effectiveness and engagement of live roleplay and Telepresence-enabled simulations



# Contingency Contracting Simulation

- Training simulation for DAU
- Uses elements of role playing and pervasive or Alternate Reality Gaming
  - Uses common technologies: email, phone calls, SMS
  - Students interact with in-simulation characters
- To accommodate small, asynchronous groups most elements are pre-produced and delivered through automated system

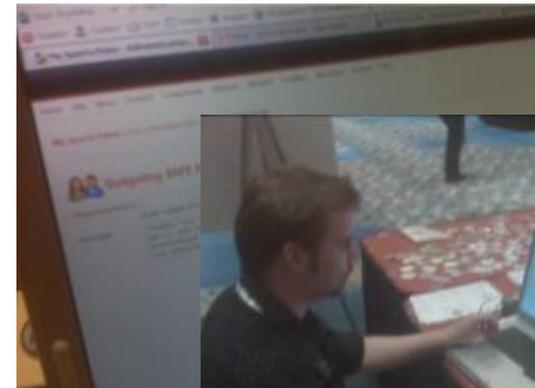


**MENTORS IN IRAQ**



# ARG

- Conference-based ARG to teach leadership, compliance, and workforce diversity issues
- Live and virtual experience

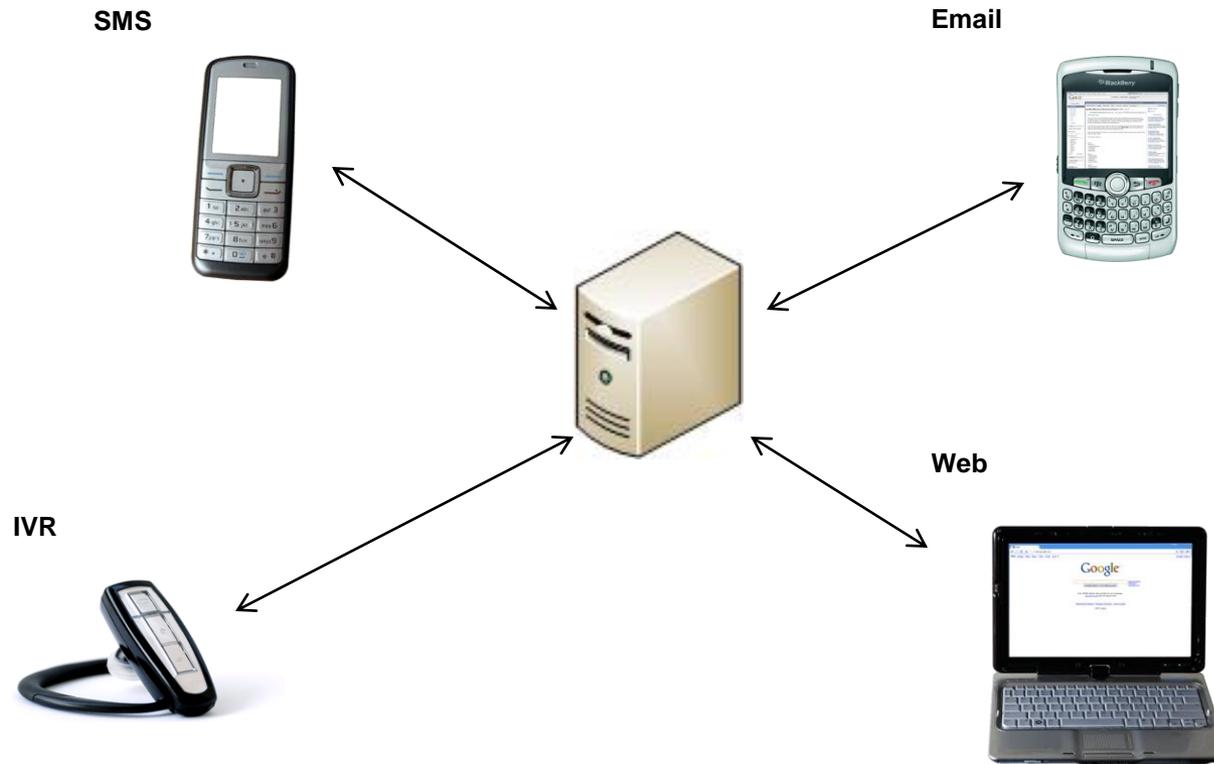




# Google Leadership Game

- Interactive experience using Moving Knowledge for leadership, new product launch and presentation skills
- **Represents a “gLearning” mashup with 7-8 Google tools- YouTube, Gmail, GoogleDocs, Moderator, GoogleTalk, etc.**
- 1 Month curriculum created and produced in 3 weeks. 1 year program in 6 weeks. Time and Cost Efficient
- [demo@movingknowledge.com](mailto:demo@movingknowledge.com) or text to 3212307958 keyword DEMO

# Moving Knowledge @ Google



**The Moving Knowledge Engine is able to interface with several modes of communication including Text Messages, Email, Interactive Voice Response, and the Internet giving users the ability to access content from virtually anywhere.**

**Moving Knowledge**

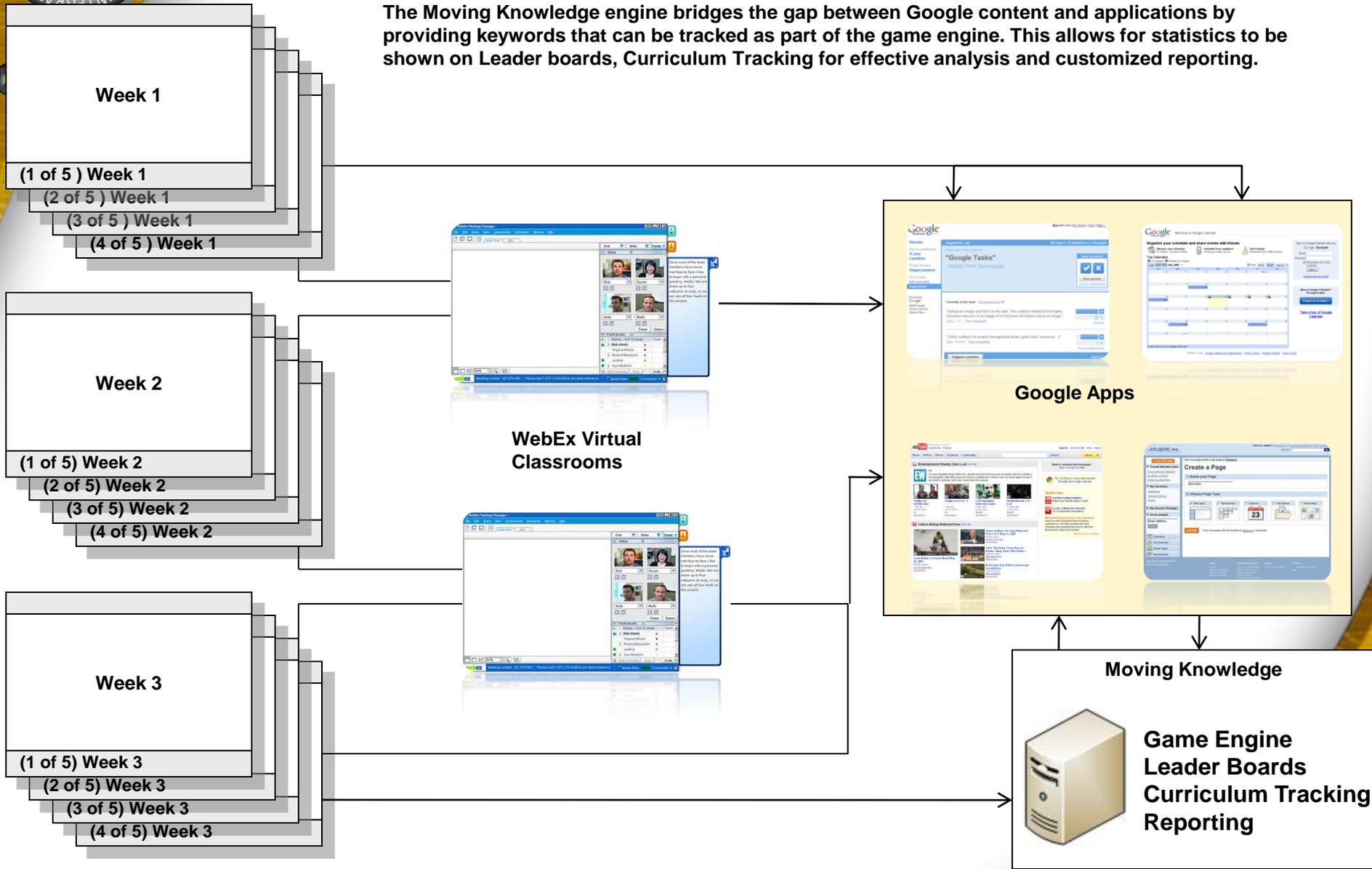


**Multimodal Delivery and Interaction**



# Curriculum for gLearning @ Google

The Moving Knowledge engine bridges the gap between Google content and applications by providing keywords that can be tracked as part of the game engine. This allows for statistics to be shown on Leader boards, Curriculum Tracking for effective analysis and customized reporting.



Week 1

(1 of 5) Week 1

(2 of 5) Week 1

(3 of 5) Week 1

(4 of 5) Week 1

Week 2

(1 of 5) Week 2

(2 of 5) Week 2

(3 of 5) Week 2

(4 of 5) Week 2

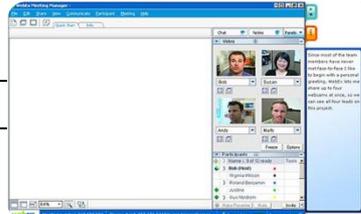
Week 3

(1 of 5) Week 3

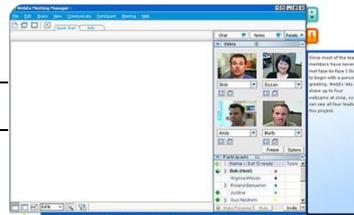
(2 of 5) Week 3

(3 of 5) Week 3

(4 of 5) Week 3



WebEx Virtual Classrooms



Google Apps



Moving Knowledge



Game Engine  
Leader Boards  
Curriculum Tracking  
Reporting



# Moving Knowledge

- A METIL Lab spinoff and licensee small business to easily commercialize and serve commercial industry
- Operationalize key innovations, particularly mobile technology and games for learning
- Flexibility of contracting through Moving Knowledge Small Business or UCF University Research Partnering Agreement



# Allogy: Lessons Learned

- Our students consider this their best learning experience
- One semester is tight for a development project
  - Multi-Semester projects advisable
- Works best with small (5-7) teams of gifted and motivated students
- Blended teams from freshman through senior years provide an ideal mix for mentorship and leadership
- Practical application an essential motivator



Video nano / m4v



Online / Flash



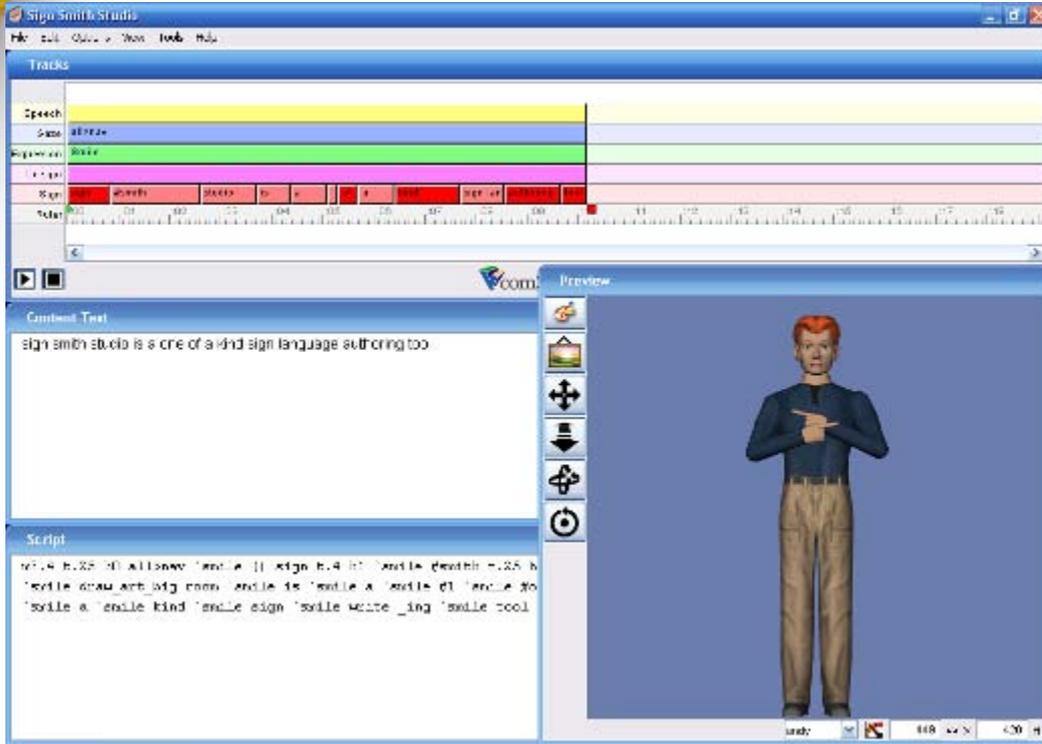
**Instructor:** A customer has just approached your workstation. Please select the appropriate greeting from the choices below.

- Yes?
- Do you need something?
- Good morning! How may I help you?

**Author Once, Use Everywhere**



# Sign Smith STUDIO



Signing  Science!  
Pictionary





# Android Club and Mobile Monday Kickoff





# Future Goals and Needs

- Continued integration of emerging technologies that go beyond Web 2.0 (mobile, VW, Games/Sims, Collab/KM) to advanced concepts and tools in augmented cognition, telepresence, and other disciplines
- Partners with similar vision and big goals to achieve significant results
  - Interesting projects that are big enough to have impact
  - International partnerships that meet the broad goals of UCF
- Resource strategies for people, funding, and tools that can create a sustainable, large innovation factory
  - Spin-off multiple commercial entities and help launch/fund startup activities for students, faculty and our staff





## Contact Info

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