WARFIGHTER READINESS RESEARCH
DIVISION OVERVIEW

Mark E. Sturgell
Technology Integration Manager
Human Effectiveness Directorate
Air Force Research Laboratory
Mesa Research
AFRL/HEA Vision

The Warfighter Readiness Research Division—Preeminent in the science and technology of training airmen
AFRL/HEA Mission

Research, develop, demonstrate, evaluate and transition leading edge technologies and methods to train warfighters, enabling the expeditionary air and space force

“The best way to predict the future is to create it”

Peter Drucker
Government Disciplines
(Mesa Data Only)

• Cognitive Psychology
• Experimental Psychology
• Industrial/Organizational Psychology
• Instructional Psychology
• Aviators
• Flight Surgeon
• Intelligence Specialist
• Physiology
• Security Specialist
• Aeronautical Engineering
• Electrical Engineering
• Mechanical Engineering
• Computer Science
• Operations Research
• Optics
• Physics

S&E Workforce

30% Bachelor
28% Master
42% PhD
On-site Contractor Disciplines  
(Mesa Data Only)

- Educational Psychology
- Experimental Psychology
- Computer Science
- Operations Research
- Mathematics
- Physics
- Visual Perception
- Aeronautical Engineering
- Human Factors Engineering
- Network Engineering
- Software Engineering
- Systems Engineering

- Aircrew Training SME
- Cockpit/IOS Design/Fab
- Multimedia Graphic Design
- Visual Display Design/Fab
- Statistical Analysis

S&E Workforce

- Bachelor: 63%
- Master: 30%
- PhD: 7%

Bachelor: 3024
Master: 24
PhD: 5

Bachelor: 63%
Master: 30%
PhD: 7%
Core Competencies

• Theory and Science of Learning and Instruction

• Methods for Development and Evaluation of Warfighter Training

• Tools and Technologies for Training for Warfighting

• Tools and Technologies for enhanced Flight Line Maintenance operations
Extramural Collaborators

Multinational Partners
Where We Are

Programs with upcoming transitions

- 20/20 Immersive Visual Display for DMO
- Warfighter Readiness Assessment and Performance Measurement Tracking System (WRAPMTS)
- Joint Terminal Air Control Training and Rehearsal System (JTAC-TRS)
- Deployable DMO
20/20 Immersive Visual Display for DMO

• High fidelity visual and sensor simulation system for day & night combat ops training & mission rehearsal
• Low O&M cost
• Eye-limited high resolution projector
• PC-based image generator
• Correlated multi-spectral geo-specific photorealistic visual & sensory imagery
• Development with Evans & Sutherland
• In Transition Now
Warfighter Readiness Assessment & Performance Measurement Tracking Sys.

- Defines mission requirements in knowledge, skill, experience terms (e.g., fighters, AWACS, AOC, Space, IO/IW, UAV)
- Enables *proficiency-based* requirements and assessments
- Human-centered performance measurement standards
- Automated performance assessment and tracking tools
- Transition in FY08
Joint Terminal Air Control Training and Rehearsal System

- Unique, human-in-the-loop Close Air Support / Special Tactics training and rehearsal
- High fidelity, realistic visualization with sensor, simulator and database correlation
- Embedded training strategies and methods
- Real-time visualization techniques
- Capability to operate with current JTAC tools and interoperate with legacy sims
- CSAF endorsed approach; Brings JCAS into DMO
- 4-phase leveraged spiral development
  - Immersive Environment
  - Schoolhouse
  - Garrison/Deployable
  - Man-Portable
- Transitions: FY08, FY09
Deployable DMO

- Deployable mission operations training and rehearsal technology suite for full combat tactical training and rehearsal
- Task-training level fidelity requirements
- Scaleable architecture to support desktop and palletized DMO training and rehearsal
- Agent-enabled syllabus authoring methods
- Simulation/instruction management tools
- Interactive after action review/debrief tools
- Increased availability of higher fidelity training environment for operational units

- Transition: FY10
Where We Are Going

Distributed Mission Training

Live Training with Common Performance Measures

Performance Measurement

A/A (2A) CT Syllabus for Training Research
DMT Exercise

Distributed Mission Operations

Tailored Scenarios & Validated Measurement

Knowledge / Skills

Supporting Competencies

MECs

Experiences
Where We Are Going

Optimize readiness training and rehearsal experiences by providing scientifically-based advanced distributed simulation capability incorporating live, virtual and constructive players.
Where We Are Going

AUTOMATED SYSTEMS TAILOR SCENARIOS
BASED UPON INDIVIDUAL PROFICIENCY

EMBEDDED INTELLIGENT TUTORS COACH STUDENTS

EMBEDDED AGENTS ASSESS PERFORMANCE
Warfighter Readiness Training Research Contract

Contract Type: CPFF, IDIQ, Multiple Delivery Orders
Period of Performance: July 2005 – July 2010
Ceiling: $300M
Place of Performance: Mesa, Arizona (www.mesa.afmc.af.mil)

POC: Jay Carroll (AFRL/HEA)
480-988-6561 x148
jay.carroll@mesa.afmc.af.mil

<table>
<thead>
<tr>
<th>Description</th>
<th>Benefits to the Warfighter</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-demand integration of live, virtual, and constructive systems to immerse the warfighter in realistic operational environments</td>
<td>• Immersive, theater level, integrated training and rehearsal systems</td>
</tr>
<tr>
<td>• Rapid database and scenario development</td>
<td>• Mission rehearsal based on rapid integration of tactical information</td>
</tr>
<tr>
<td>• Models of human learning and effectiveness</td>
<td>• Theater-level performance measurement &amp; assessment</td>
</tr>
<tr>
<td>• DMO performance measurement &amp; assessment</td>
<td>• Enhanced training realism</td>
</tr>
<tr>
<td>• C4ISR live/simulation linkage and recovery</td>
<td>• Reduced cost and overhead associated with DMO training &amp; rehearsal</td>
</tr>
<tr>
<td>• Distributed event integration &amp; management</td>
<td>• Reduced footprint and more efficient reachback</td>
</tr>
<tr>
<td>• Distributed system reliability &amp; security</td>
<td></td>
</tr>
</tbody>
</table>

Technologies
Science & Technology For Training and Logistics Transformation

Research, develop, demonstrate, evaluate, and transition leading edge technologies and methods to train warfighters and optimize human-centered logistics processes, enabling the expeditionary aerospace force.

**Description**

Research, develop, demonstrate, evaluate, and transition leading edge technologies and methods to train warfighters and optimize human-centered logistics processes, enabling the expeditionary aerospace force.

**Benefits to the Warfighter**

- Immersive, theater level, integrated training and rehearsal systems
- Mission rehearsal based on rapid integration of tactical information
- Theater-level performance measurement & assessment
- Reduced cost and overhead associated with DMO training & rehearsal
- Reduced footprint and more efficient reachback
- More efficient logistics operations
  - Faster planning/replanning
  - Less manpower & quicker deployment response

**Technologies**

- Models of human learning and effectiveness
- DMO performance measurement & assessment
- C4ISR live/simulation linkage and recovery
- Distributed event integration & management
- Integrated Portable Human Computer Interfaces

**SCHEDULE:**

BAA Announcement: Dec 2004 (BAA 05-04 HE)
Receive Proposals: Open through 31 Dec 2009
Number of Awards: TBD

**Contract Type:** Cost Plus Fixed Fee or Cost (no fee)/Cooperative Agreements or Grants
Ceiling: $24.9
Acquisition POC: Jay Carroll (AFRL/HEA)
480-988-6561 x148
jay.carroll@mesa.afmc.af.mil