

# LAW ENFORCEMENT RESEARCH INITIATIVE

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## **CAVS** Overview

- Research Center at Mississippi State University
- ~250 Faculty, Staff and Students
- Major Areas of Research
  - Human Factors and Ergonomics
  - Materials and Computational Manufacturing Design
  - Computer Simulation, Resources, and Training

## HFE LAB

### Researchers from many fields

- Cognitive Psychology
- Biomechanics
- Human Factors
- Ergonomics
- Recent and Current Projects
  - US Army Virtual Soldier Research
  - Automotive Manufacturing Workspaces
  - Automotive Design

### What We Do

- Ergonomics
- Usability/Interface design
- Effective Multitasking
- Situation Awareness
- Vision and Memory
- Decision making
- Strategic thinking
- Skill acquisition
- Team Dynamics and Communication

### History of Law Enforcement Research

- US Army Virtual Soldier Research
  - Computer simulation of soldier performance
  - Simulations Need Real World Data
- Local Law Enforcement
  - Tactical activities similar to MOUT activities
  - Unique and interesting research issues in Law Enforcement operations

## An Example: New Technology

- US Army Future Combat Systems Land Warrior
- Is it reliable?
- Most important, is it the right technology for the task?



The Army's New Land Warrior Gear: Why Soldiers Don't Like It – Popular Mechanics

## Real Problems, Real Solutions

### Applied Research

- Partners come to us with issues
- Work closely with partners to plan research and find funding
- Work toward practical solutions
- Basic Science
  - Applied Projects Can Contribute to Scientific Understanding

### Research Opportunities for Law Enforcement

- LE Operations
  - Tactical, Patrol, Traffic, Dispatch, etc.
- Safety
  - Officer: General well being/long term risk/high risk activities
  - Public: Minimize risk, perception of LE
- Performance and Reliability
  - Accuracy, speed, decision making, training, equipment

## **Current Ongoing Projects**

- Evaluating Weapons Qualification
- Evaluating Tactical Team Training
- Analyzing Tactical Planning
- Training Tactical Capabilities for Patrol Officers
- High Performance Driving
- Personal Body Armor and Equipment



## **Tactical Team Operations**

Making Available Video and Analysis Resources for Tactical Training Operations
Analyzing Tactical Team Planning/Decision Making



## Patrol Officer Active Shooter Training

- Patrol Officer Rapid Response to Active Shooter Scenarios (i.e. Virginia Tech)
  - BJA Proposal for Training Funds
  - Evaluate Train-the-trainer
  - Evaluate effectiveness of training for patrol officer performance

## **Location-Specific Training**



### Use Gaming Environments

 Build accurate videogame levels based on real-world settings

#### Training Tools

- Officers learn the layout of buildings not usually available for training activities
- Action Planning Tools
  - View layouts of buildings in the field
  - Analyze architecture to identify danger zones



### Vision and Memory

- Target Discrimination
  - Visual scanning and memory
  - Low-Light Conditions



#### Post-Event Memory

- Testing memory and debriefing techniques
- Improve reports/testimony





## **Body Armor Ergonomics**

#### Impact on Biomechanics and Task Performance

- Range of Motion
- Weapons Handling
- Dynamic Movements



## Extended Coverage

- 3000+ Body Armor Saves
- Serious Design Issues
  - Weak Areas
  - Coverage Focused on Fatal Zones
  - Weight
  - Temperature

#### Possible New Designs

- Protect non-fatal zones
- Analyze ergonomic impact
- Improve return-to-work for wounded officers
- Reduce likelihood of permanent disability



### **Research Projects on the Horizon**

- Team Dynamics
- Vehicle Design
- Attention and Situation Awareness

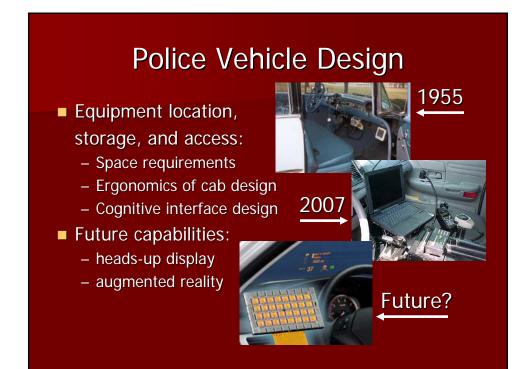
## **Team Performance**

- Team Dynamics
  - Maintaining Team Communication
  - Impact of Loss of Team Leader

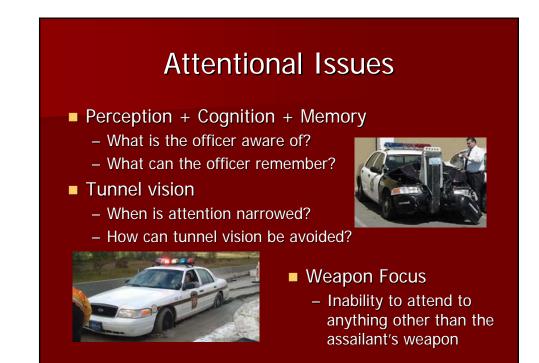




- Tactical Roles in Teams
- Team Decision Making and Tactics
- Interdepartment operations and training









- Many Projects suggests...
- Potential for a Research Center focused on Human Factors and Ergonomics for Law Enforcement

## Vision for Research Center

- Research activities focused on providing real answers to real problems
- Collaboration with departments state- and nation-wide
- State-of-the-art facilities available for research and training
  - Simunition shoothouse
  - Video/Audio/Motion recording equipment
  - Biometric/Cognitive measures of performance
- Test and evaluate:
  - Equipment and Vehicle Design
  - Training
  - Tactics

## What We Need

### Partners

- Bring us your problems
- Allow access to officers for research
- Provide expertise on current training and operations
- Comment on and review our work

#### Support

If you think we can be helpful, spread the word

## Summary

- Researchers at State looking for real-world human factors issues
- Collaborate on proposals for funding
- Possibility for a local tactical team competition
- Potential for a state-of-the-art research center focused on law enforcement

## Thanks

- Information on our current research programs available
- Contact info:

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