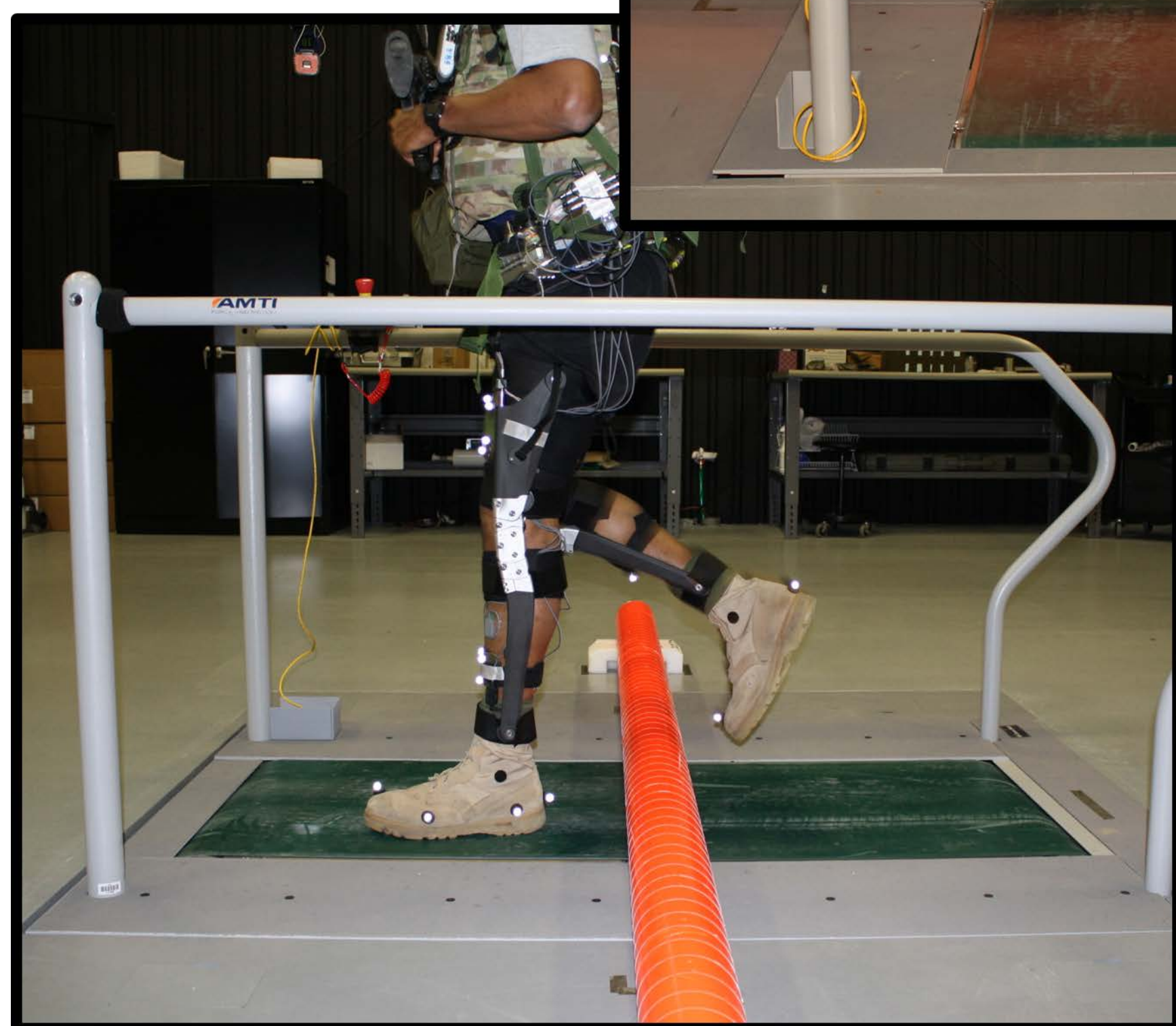


S&T Campaign: Human Sciences
Human Capability Enhancement
Augmentation

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Research Objective

- Identify the variables that strongly indicate particular gait states and transitions between gait states in humans so that effective control algorithms can be developed for exoskeletons and other personal augmentation systems
- Examine human gait under the conditions and in the environments in which dismounted Soldiers operate (e.g., carrying a heavy rucksack and walking up and down hills or tactical movements on uneven terrain)



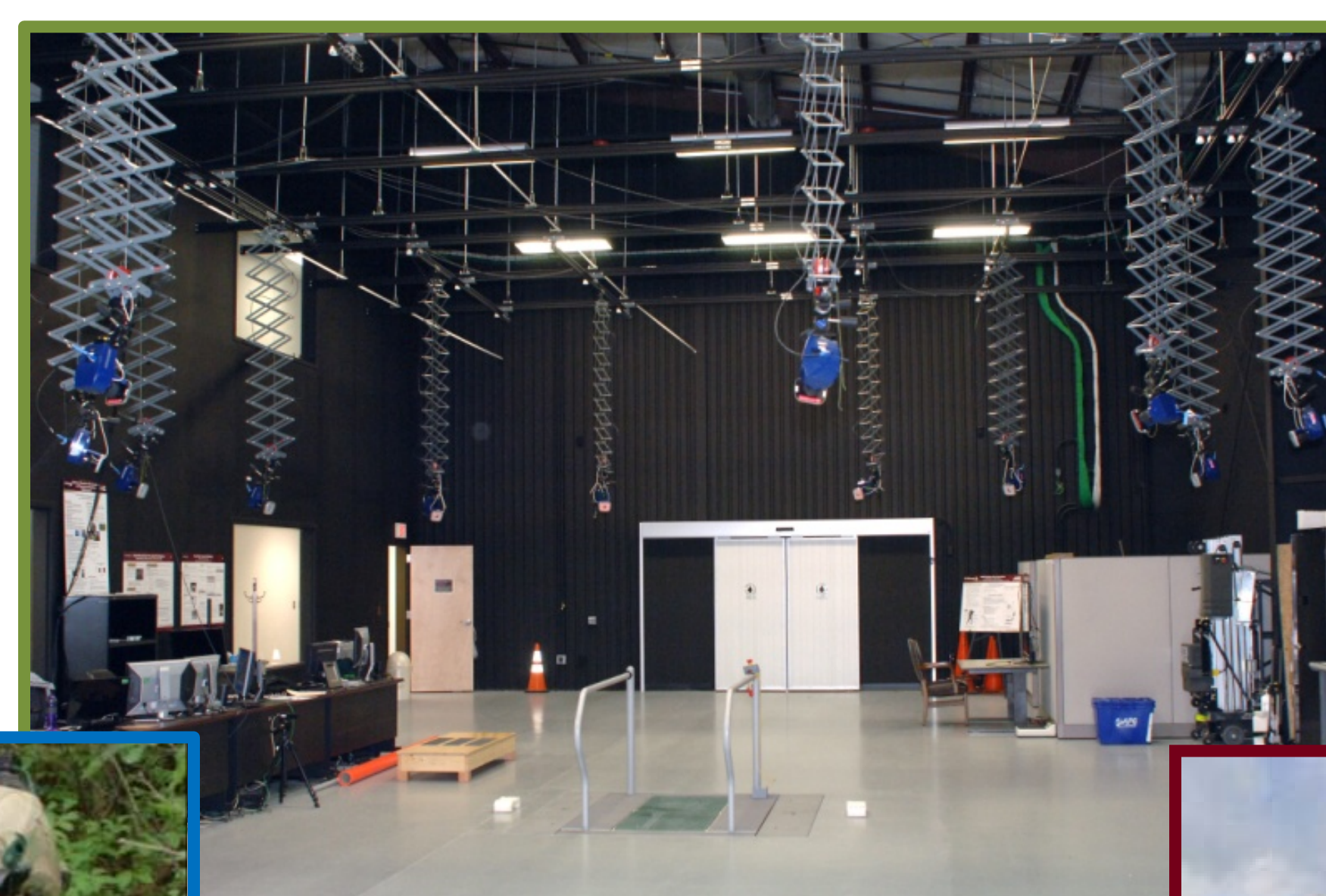
Examples of personal augmentation devices developed for the Defense Advanced Research Projects Agency (DARPA) Warrior Web program

Challenges

- Finding variables that consistently indicate gait states and transitions between gait states regardless of individual differences in gait mechanics
- Identifying variables that consistently indicate gait states and transitions between gait states in all of the environments Soldiers operate in and across the various loads that they carry

ARL Facilities and Capabilities Available to Support Collaborative Research

- Soldier Performance and Equipment Advanced Research (SPEAR) Facility at APG, MD
 - Biomechanics Laboratory
 - Instrumented Obstacle Course
 - Cross Country Course with WiFi Network
- Portable Cardiopulmonary Exercise Testing Equipment
- Electromyographic Systems (Surface and Indwelling Electrodes)



Soldier Performance and Equipment Advanced Research (SPEAR) Facility (Clockwise from the top: Biomechanics Laboratory, Obstacle Course, Cross Country Course)

Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- Theoretical and experimental motor control researchers
- Pattern recognition and machine learning specialists
- Statisticians