



U.S. ARMY  
**RDECOM**

# Applying Survivability Analysis to Body Armor Decisions

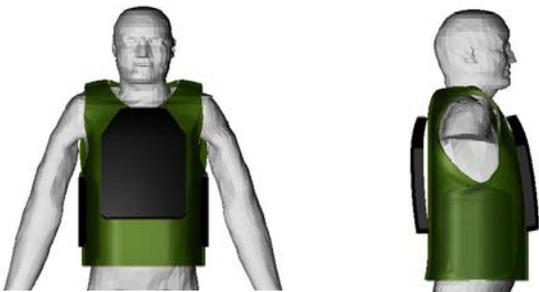


## S&T Campaign: Assessment & Analysis *Military Injury Biomechanics*

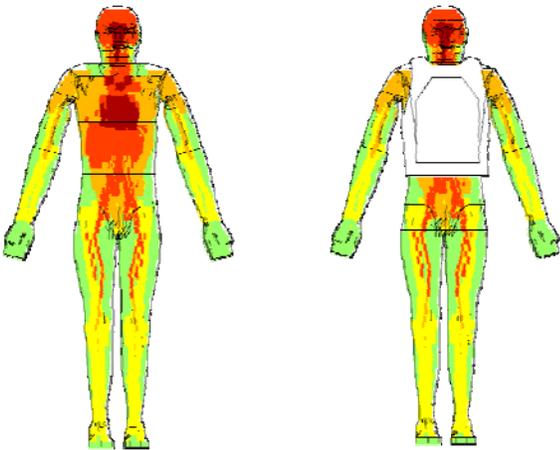
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### Research Objective

Ballistic specifications for the Army's current body armor are based on defeating a specific threat, not on mitigating injuries. Therefore, one cannot be confident the specification is relevant, and thus that the body armor is solving the right problem.



Modeled Armor System on the Operational Requirement-based Casualty Assessment (ORCA) Human Anatomy



Quantifying area of coverage and area of protection in terms of injury

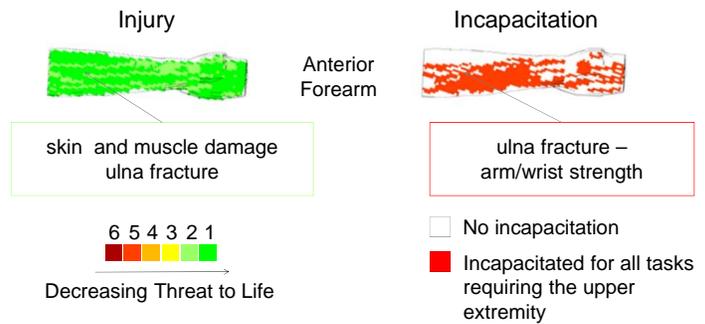
### ARL Facilities and Capabilities Available to Support Collaborative Research

- Joint-service model used by analysts in evaluating the effect of battlefield insults on personnel targets to predict injury and functional impairment
- Vulnerability expertise (analysts, mathematicians, engineers)
- In-house model developers
- Ballistic and blast experimental facilities (EF10 and EF20)

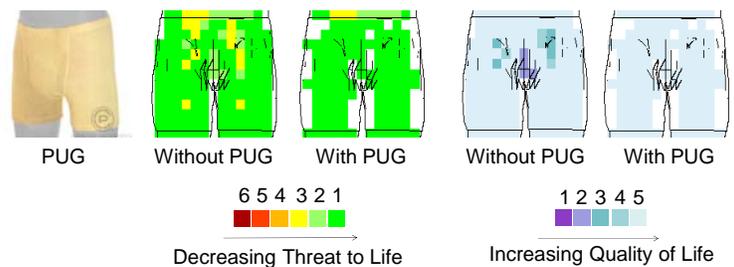
### Challenges

- How can we make our anatomy models representative of the current Soldier population, male and female?
- How should we improve the anatomy models' resolution?
- How do military injuries effect human performance?
- How do new armor materials respond to ballistic threats?
- How can we use additional dimensions of injury to better design body armor?

#### Protecting Upper Extremities



#### Effectiveness of Protective Undergarment (PUG)



Analysis that has led to body-armor enhancements and fielding decisions.

### Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Providing an understanding of military relevant injuries
- Modeling for specific human morphologies
- Characterizing task performance of injured soldiers
- Modeling injury prevention using advanced materials and processing for soldier protection