Military Injury Research to Evaluate Human Vulnerability in Combat

S&T Campaign: Assessment & Analysis
Military Injury Biomechanics

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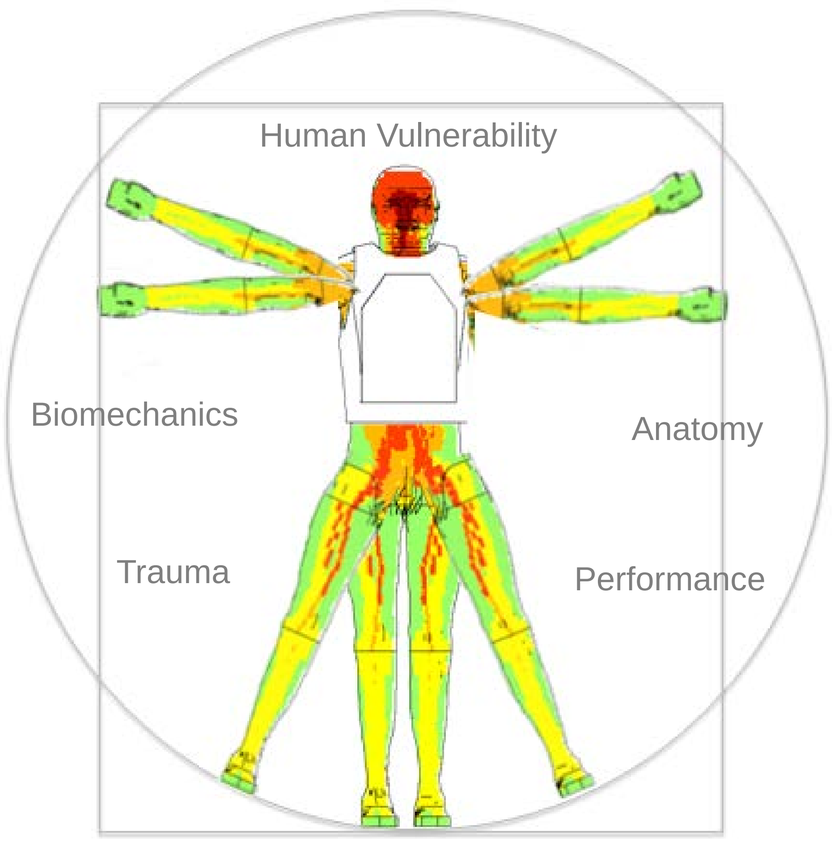

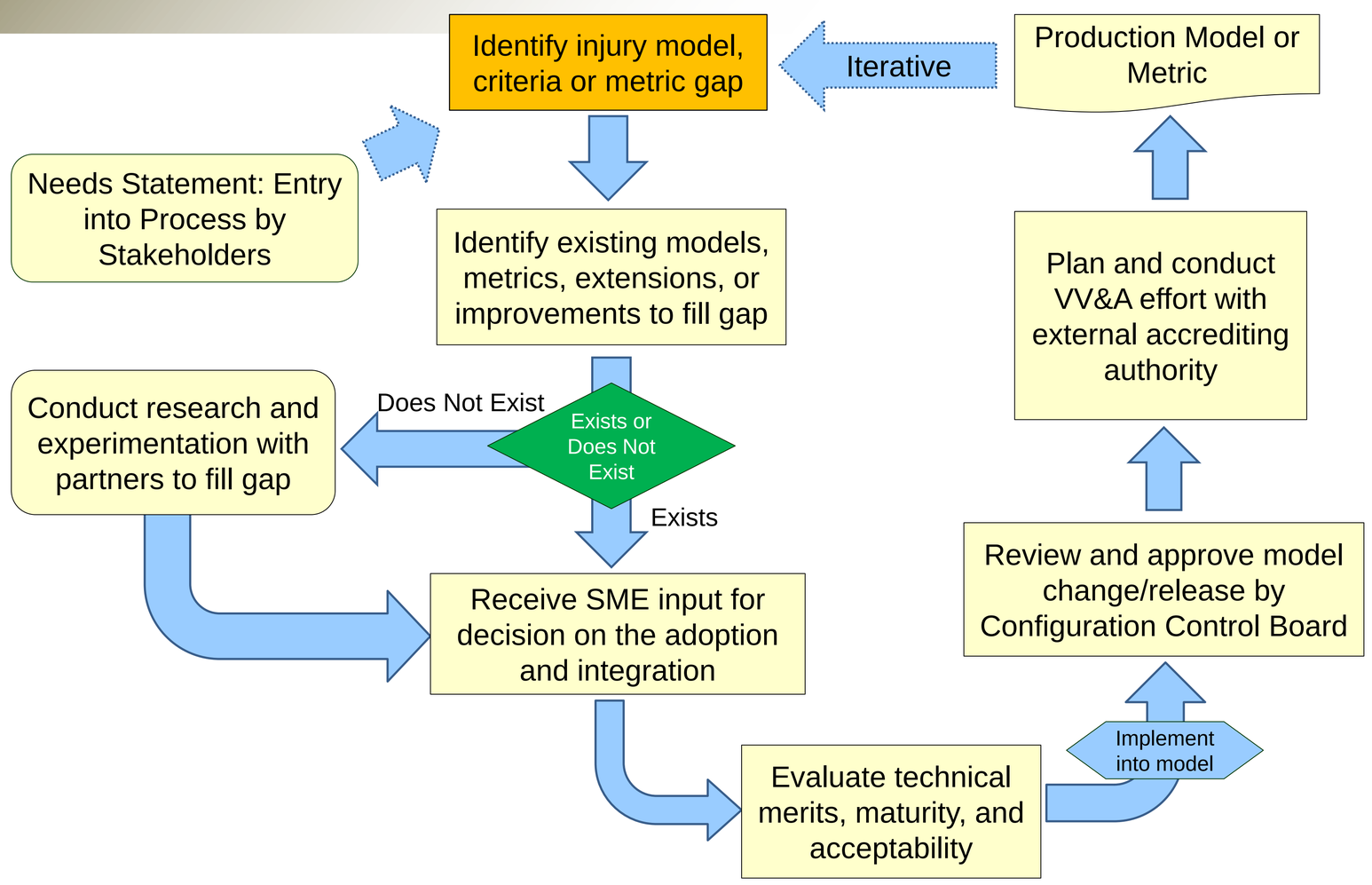

Research Objective

- Improve modeling of anatomical damage and effects on physiology to support the full range of assessments for combat systems
- Fill knowledge gaps in personnel vulnerability to apply methodology for the evaluation of protective and weapon systems

Challenges

- **Modeling human performance** – cyclical activity, task repetition, gender differences, relationship to body type, motion modeling, physical fitness, and muscle endurance
- **Modeling physiological stress in terms of attention and perception** – Understanding the correlation of cognitive capabilities to motivational capabilities (personality, intelligence, experience, combat hardness, level of training) and understanding performance and behavior changes from thermal stress and fatigue
- **Performing Trauma Scaling** – Scaling bio-research data across species, gender, shape, size and age

ARL Capabilities Available to Support Collaborative Research

- Joint-service model which enables the investigation and methodology to reduce vulnerability and enhance the survivability and effectiveness of the individual service member to combat threats.
- Decades of vulnerability expertise (analysts, mathematicians, engineers) relating to service members and their equipment.
- In-house computational modelers and model developers supporting a wide range of hostile threat environments

Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- Professionals with expertise to perform technical review of methodology in support of validation activities
- Expertise in human effects of toxic gases especially combustion by-products
- Complementary human engineering and biomechanics models for research and analysis

Acceleration | **Fragments** | **Thermal** | **Overpressure** | **Directed Energy** | **Bullets** | **Toxic Gas**