Musculoskeletal injuries (MSK-I) of Warfighters are substantial, cause millions of lost-duty days, and are arguably the leading medical problem eroding military readiness. Most of these injuries are non-battle injuries.

The Need:

- Human modeling and simulation accelerates the design of better military products
- A centralized platform to support complex and fully integrated predictive models of the Warfighter to address the injury issue.
- A need for a comprehensive and expandable human model that will help reduce injuries and decrease MSK-I health care costs
- Simulation for the prevention and better understanding of the mechanisms that cause injury.

Objective
To develop a simulation platform for understanding the mechanisms of Warfighter Musculoskeletal Injury (MSK-I) in order to reduce their occurrence and identify training interventions to enhance Warfighter performance.

The output of the system is a determination of the propensity of injury for a specific MSK injury and for a particular task that have been specified. An additional output is a dashboard that shows a real-time simulation. A significant capability of the MALUM TERMINUS simulation system is its ability to import experimental data and existing models. This effort will enable capabilities to import related data, process these data through computational models to yield mathematical representations, and implement these representations in functioning modules that interact with other modules within the overall simulation system.

**RESEARCH CHALLENGES AND OPPORTUNITIES:**

- Designing formulations for predictive human motion
- Modeling of MSK injuries
- Deriving theory and mechanisms for large data
- Securing MSK injury data
- Predicting biomechanics and physiological performance