



Human System Community of Interest

**Protection, Sustainment, and Physical
Performance Sub Area**

**Sub Area Co-Chairs: Mike LaFiandra (ARL)
Jeff Schiffman (NSRDEC)**

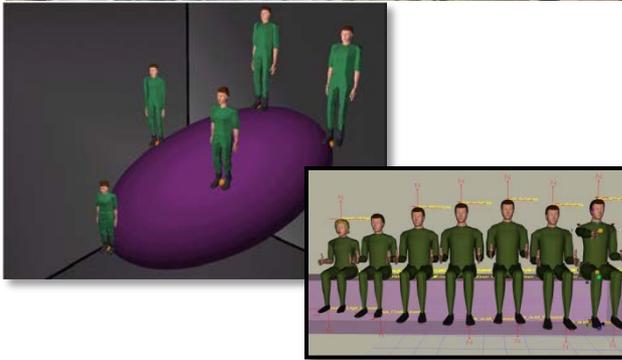


Human Systems Protection, Sustainment and Physical Performance



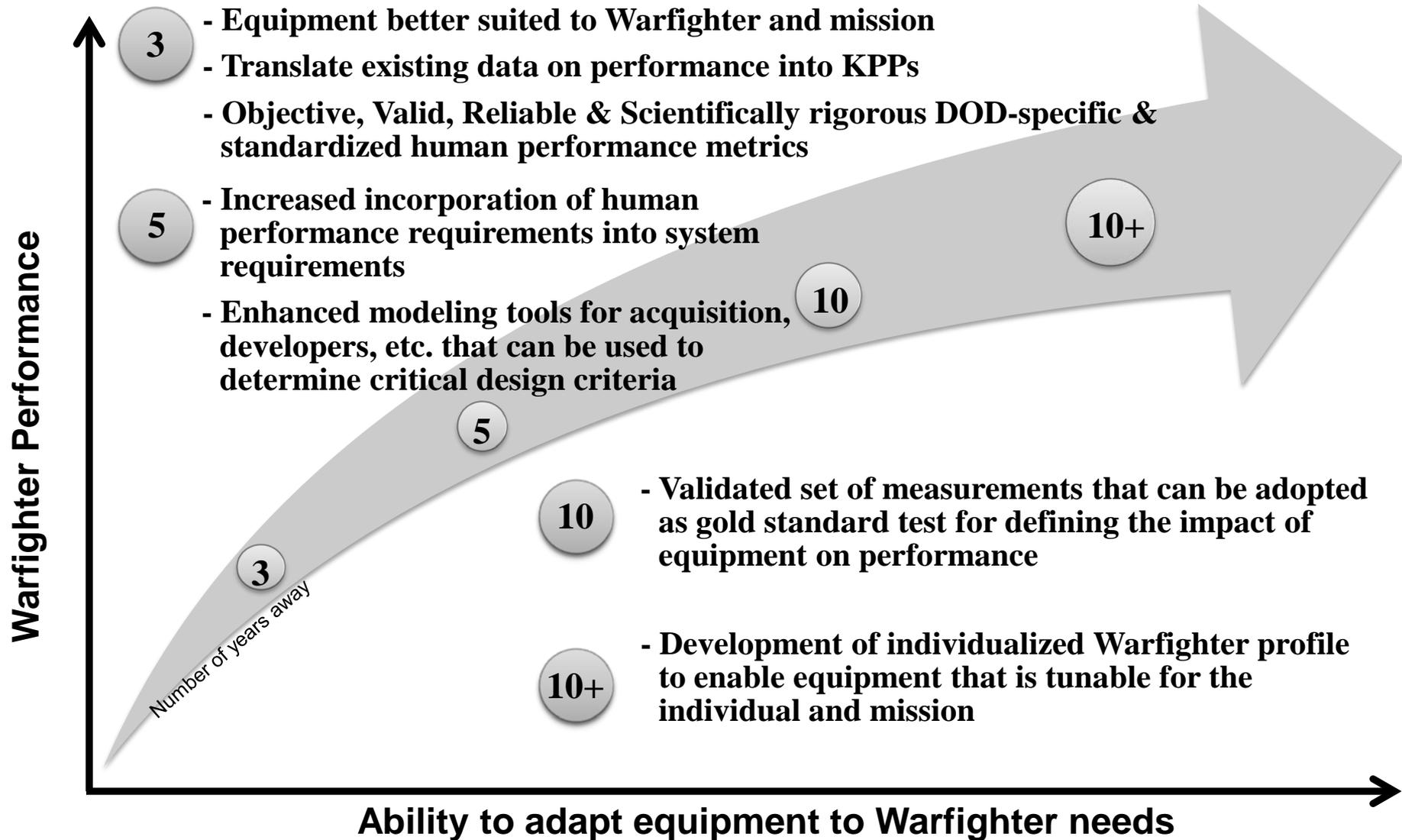
Problems:

1. Warfighter performance is a complex multidimensional construct.
2. Equipment designed to provide a capability many times inhibits performance.
3. Individual differences are not appropriately accounted for. *People are not made to a design specification.*





Protection, Sustainment and Physical Performance End States





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- **CHALLENGE 1: UNDERSTANDING THE MULTIPLE DIMENSIONS THAT AFFECT PERFORMANCE**
 - Define critical stressors that influence performance.
 - Establish meaningful metrics and methods for measuring these critical stressors.
 - Understand ways of mitigating the effect of these stressors.
- **CHALLENGE 2: UNDERSTANDING THE TRUE TRADE-OFFS OF NEW CAPABILITIES**
 - Standard measures of performance are not adequate for measuring warfighter performance in operational settings.
 - Define and validate operationally relevant test capabilities, metrics and measurement methods.
- **CHALLENGE 3: UNLIKE OTHER SYSTEMS, HUMANS ARE HIGHLY VARIABLE**
 - Understand how to design for and exploit individual differences.



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#1 – Understanding Critical Stressors

Gaps

- The underlying mechanisms by which specific stressors result in changes in performance are poorly understood.
- Research on interaction between factors is lacking.
- Effects of stressors on a broad range of operationally relevant performance tasks is needed.
- Some candidate stressors:
 - Physical Fatigue
 - Mental Fatigue
 - Sleep Deprivation
 - Heat Stress
 - Caloric Deprivation

#2 – Developing Operationally Relevant Metrics

Gaps

- Warfighter performance is broader than merely studying physical or cognitive performance.
- The ability to collect high resolution human performance data in an operational setting is lacking.
- Agreement of performance metrics between scientific and operational personnel needs to be realized.
- Standard tasks/platforms/ environments for experimentation.

#3 – Understanding Individual Differences

Gaps

- Methods to examine individual differences – size, physical capability, gender, etc., are lacking.
- The study of individual differences requires more novel statistical methods and much larger sample sizes.
- Develop gold standards for understanding individual differences.
- Links between individual differences and optimized warfighter tasks need to be established.



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- **Research topics include:**
 - Combat clothing and equipment
 - Combat field rations
 - Physical and nutritional aiding and enhancement
 - Fatigue
 - Extreme environments
 - Interaction between physical and cognitive stress
 - Ingress, egress, and seating requirements for platforms
 - Crash safety
 - Survival and rescue
 - Human- system integration for optimal performance