Preparing for the future….
Never forgetting the past!

Office of Naval Research Code 30
Thrust Area Willful Intents
FY12 - FY13
### Current Capability:
- Small unit training and leader development training facilities and training processes have not changed appreciably since WW II.
- Research, technology and adult learning strategies have not been used to improve training requirements and efficiency.
- Focus on small unit training, adaptive thinking and decision making is desired and not reinforced by formal policies.

### Desired Capability

<table>
<thead>
<tr>
<th>FY</th>
<th>Desired Capability</th>
<th>S&amp;T Challenge</th>
<th>S&amp;T Solution</th>
</tr>
</thead>
</table>
| Near Term FY12-FY14 | • Small unit training based on learning science.  
• Methods and technologies to improve the efficacy and efficiency of USMC training for current operations.  
• Prototype simulations to support training adaptability and decision making. | • Models of adaptability and decision making exist, but they have not been explored, adapted and used to effectively and efficiently train inexperienced warfighters.  
• Lack reliable and valid metrics and assessment techniques to evaluate the impact of learning science methods on small unit training.  
• Lack human performance assessment technologies that reduce instructor/student workload & contractor support. | • Construct a generalized model of adaptability and tactical decision making suitable to Marine Corps dismounted tasks.  
• Codify existing learning models and theories; empirically validate causal relationships between individual trainee inputs and adaptations that result in accelerated learning and skill acquisition.  
• Develop systems and algorithms that can infer the state of the trainee; empirically validate feedback (both dynamic and after-action) as a factor of trainee state and demonstrate accelerated learning and skill acquisition.  
• Develop methods to capture data (T&R, lessons learned, etc.) and rapid knowledge extraction from subject matter experts. |
| Mid-Term FY15-FY17 | • Affordable, flexible, interoperable training environments that optimize the learner's ability to adapt to changing mission parameters and conditions. | • Lack of a comprehensive view of how people learn and acquire complex skills and how their individual differences influence learning.  
• Develop learning systems that adapt to trainee differences. | • Formulate and validate a comprehensive, generalizable adult training theory based on the validated elements of the multi-dimensional database of adult learning strategies developed in the near-term.  
• Leverage existing training assets (e.g. IIT, VBS2) to test training strategies using adaptability and stress resilience models developed in HPT&E. |
| Far Term FY18-FY20 | • Capability to track the "recruit to retiree" training and skill development profile of each warfighter.  
• Capability to create and tailor training plans for individuals and small units based on models that account for experience, expertise, career path, in order to optimize rates of learning and retention. | • Lack of research-based models of individual expertise development. Basic research indicates that experience, expertise, and chronological age each drive changes in cognitive strategies used by individuals.  
• Need robust experiential learning models and techniques that promote robust mental models, better skill retention, and improved decision making. | • Develop longitudinal "Recruit to retiree" learning models that map the entire potential training space of each Marine throughout their career.  
• Explore novel and innovative training solutions such as "Virtual mentors" and "Banked" learning approaches that facilitate learning from other performers, allowing inexperienced Marines to learn from others, even long-retired Marines through archived performance. |

### Endstate:
- Knowledge products for TECOM that maximize learning and skill acquisition at minimal cost.
- Theory-based best practices for adaptation and feedback that support accelerated skill acquisition, learning, and retention.
- Fully integrated, transition-ready training prototypes focused on decision making and adaptability.
### Warrior Resilience TIA – Willful Intent

#### CurrentCapability:
- Current USMC leadership training does not facilitate leader recognition of ‘at risk’ individuals to cognitive stress.
- Marine Corps foundational base is focused on: Effective leadership; Team interdependence and mutual trust; Development of “mental fortitude" through Crucible events.
- Lack of science-based evidence for current practices regarding innovative learning and resilience building strategies, nutritional supplement, and strategies to improve pre-deployment readiness, and physical abilities during deployments.

#### FY Desired Capability | S&T Challenge | S&T Solution
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**Near Term FY12-FY14**
- Understanding of the components of resilience, both mental and physical.
- Training strategies and tools for reducing injury, maintaining lean body mass, reducing fatigue, and enhancing physical performance as a function of load, terrain, temperature, hydration, food, and altitude.
- The relative contribution of the behaviors, characteristics, skills, beliefs, latent traits, and other factors that support resilience differs greatly between individuals; and some of these factors to which no agreed upon scientific explanation do not exist.
- Conduct an analytical effort to deconstruct resilience into underlying systems and contributors that are amenable to scientific inquiry.
- Through direct observation under controlled conditions, understand how resilience associated with immersive combat training and other resilience building techniques modulates cognitive, physiological, and behavioral indicators.

**Mid Term FY15-FY17**
- More accurate and less intrusive measures of resilience.
- Ability to track individual differences in resilience and resilience capacity.
- Ability to tailor resilience building protocols to individuals.
- More effective resilience building methods.
- Understanding of the proximate factors (such as higher level brain systems, sleep patterns, etc) that influence chronic adaptation to stress.
- Model the natural range of behavioral cues (like voice stress, facial expressions, eye gaze) that are modified by fear, confusion, and uncertainty, to provide non-obtrusive measurement solutions.
- Identify the interplay between nutritional supplementation, physical conditioning, and operational performance, in the context of combat tasks.
- Design and execute experiments to characterize components of resilience measures as a function of repeated stress and/or resilience building strategies.
- Explore ability of hybrid measures like allostatic load, based upon psycho/physical systemic biomarkers, to determine the efficacy of strategies to expand fluid intelligence and control/harness stress responses.
- Study the interplay of physical conditioning strategies, nutrition, individual factors, and environment on performance.

**Far Term FY18-FY20**
- Ability to modify individual neuro-biological processes to improve resilience before, during and after deployments.
- Ability to deliver individualized resilience-building approaches in response to immediate needs (tailored to mission profiles and individual needs).
- The relative contribution of the behaviors, characteristics, skills, beliefs, latent traits, and other factors that support resilience differs greatly between individuals; and the relationships between them are poorly understood. Challenges to modeling these factors include complex interactions between genetics, environments, past experiences and social support structures.
- Conduct studies that modulate neurobiology systems involved in physical and psychological resilience, both prior to and during operational deployments.
- Conduct studies that identify psycho-physiological indicators of underlying neurodynamic processes, and use these to drive adaptive training systems as well as indicate the resilience readiness of individual warfighters.

#### Endstate:
- Effective Resilience Building Strategies: Marine leaders and instructors who are able to implement effective mental/physical resilience building approaches that result in measureable improvements in resilience and reductions in mental health symptoms and physical injuries.
- Human Performance Models: State-of-the-Art models that relate psycho/physical substrates to individual genetics, environment and combat stressors to readiness outcome measures, like general wellness and readiness.