NDIA
AT THE HEART OF THE MISSION

2020 HUMAN SYSTEMS CONFERENCE

Human Systems within Multi-Domain Operations

March 3 – 4 | Arlington, VA | NDIA.org/HumanSystems20

TABLE OF CONTENTS

VENUE MAP 3

SCHEDULE AT A GLANCE 3

EVENT INFORMATION 4

AGENDA 5

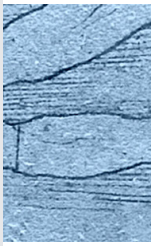
POSTERS AND DEMOS 9

BIOGRAPHIES 10

NDIA

WHO WE ARE

The National Defense Industrial Association is the trusted leader in defense and national security associations. As a 501(c)(3) corporate and individual membership association, NDIA engages thoughtful and innovative leaders to exchange ideas, information, and capabilities that lead to the development of the best policies, practices, products, and technologies to ensure the safety and security of our nation. NDIA's membership embodies the full spectrum of corporate, government, academic, and individual stakeholders who form a vigorous, responsive, and collaborative community in support of defense and national security. For more than 100 years, NDIA and its predecessor organizations have been at the heart of the mission by dedicating their time, expertise, and energy to ensuring our warfighters have the best training, equipment, and support. For more information, visit **NDIA.org**



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Peter Palmer
Vice Chair

Kelly Hale, PhD
Deputy Chair

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Jeffrey Thomas
Government Conference Co-Chair

HUMAN SYSTEMS

WHO WE ARE

The Human Systems Division promotes the exchange of technical information and discussions among government, industry, and academia. The Division supports the expansion of research and development in areas related to the human as a system whose performance must be integrated into any military system of systems. To this end, the Division provides a variety of ways for government, industry, and academia to collaborate and advance human performance in air, land, sea, space, and cyberspace through research, education, and consultation.

JOIN THE CONVERSATION

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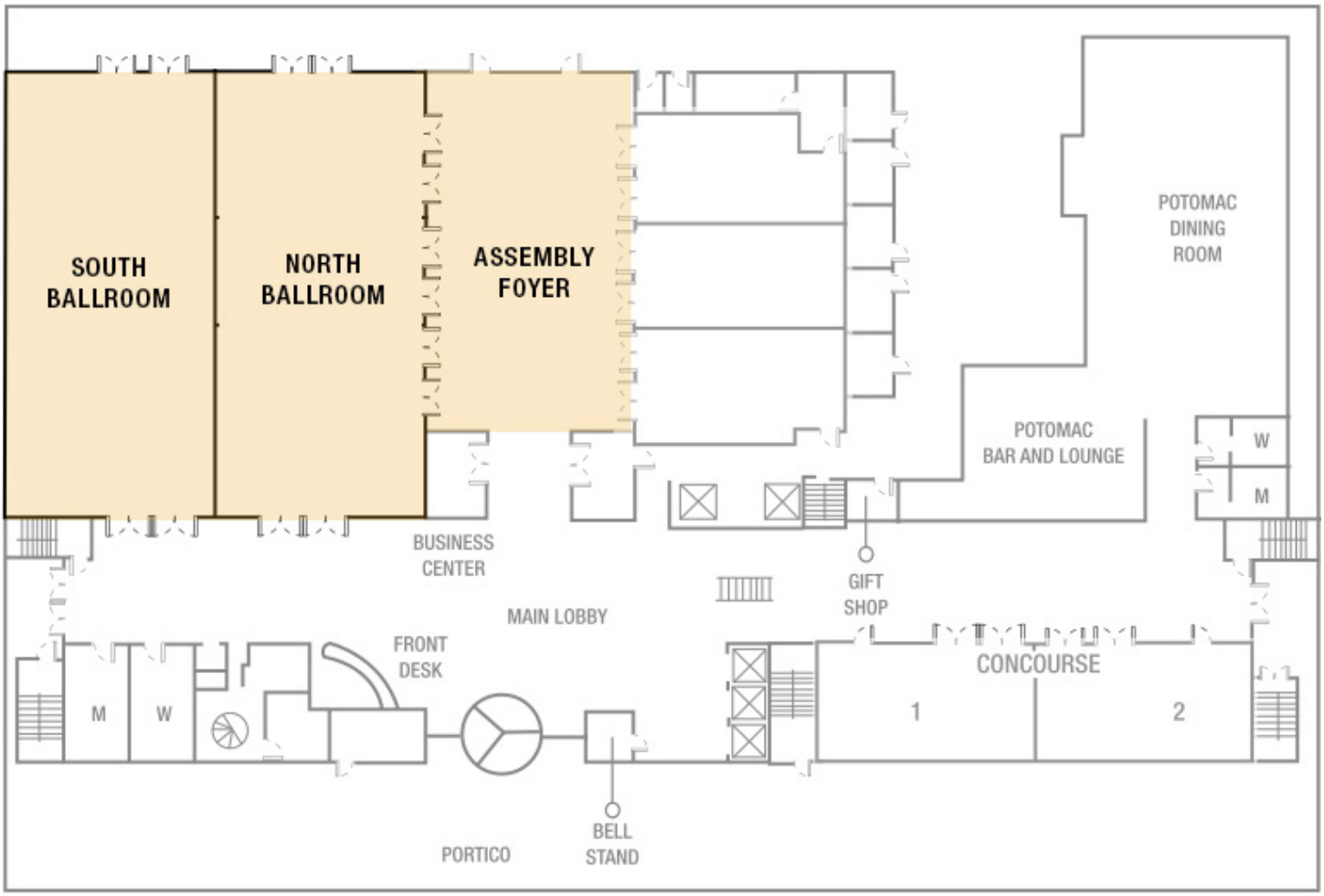
VENUE MAP



SCHEDULE AT A GLANCE

TUESDAY, MARCH 3

General Session
South Ballroom
8:00 am – 5:00 pm

Networking Lunch & Poster and Demonstration Session
North Ballroom
1:05 – 2:35 pm

Networking Reception
Assembly Foyer
4:50 – 5:50 pm

WEDNESDAY, MARCH 4

General Session
South Ballroom
8:00 am – 3:00 pm

Networking Lunch & Poster and Demonstration Session
North Ballroom
12:10 – 1:10 pm

Roundtable Discussions
South Ballroom
3:00 – 4:30 pm

EVENT INFORMATION

LOCATION

Sheraton Pentagon City Hotel
900 S Orme Street
Arlington, VA 22204

EVENT WEBSITE

NDIA.org/HumanSystems20

EVENT THEME

Human Systems within Multi-Domain Operations

WIFI

Network: Sheraton Meetings
Password: NDIA2020

ATTIRE

Civilian: Business
Military: Uniform of the Day

SURVEY AND PARTICIPANT LIST

You will receive via email a survey and list of participants (name and organization) after the conference. Please complete the survey to make our event even more successful in the future.

EVENT CONTACT

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PLANNING COMMITTEE

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Mark Draper
SI&CP Government Chair

Steve Dorton
SI&CP Industry Chair

Kelly Irvin
COI Liason

SPEAKER GIFTS

In lieu of speaker gifts, a donation is being made to the Fisher House Foundation.

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AGENDA

TUESDAY, MARCH 3

7:00 am – 5:00 pm

REGISTRATION
ASSEMBLY FOYER

7:00 – 8:00 am

NETWORKING BREAKFAST
ASSEMBLY FOYER

8:00 – 8:15 am

WELCOME AND INTRODUCTORY REMARKS
SOUTH BALLROOM

Jim McCarthy, PhD
Vice President, Instructional Systems, Sonalysts, Inc.
Chair, Human Systems Division, National Defense Industrial Association (NDIA)

8:15 – 9:00 am

FEATURED SPEAKER
SOUTH BALLROOM

BG Stephen L.A. Michael, USA
Deputy Commanding General, U.S. Army Combined Arms Center – Training

9:00 – 9:45 am

FEATURED SPEAKER
SOUTH BALLROOM

Holly Handley, PhD, PE
Associate Professor, Engineering Management & Systems Engineering, Old Dominion University

9:45 – 10:15 am

NETWORKING BREAK
ASSEMBLY FOYER

10:15 – 11:15 am

PANEL: HUMAN SYSTEMS COMMUNITY OF INTEREST (COI)
SOUTH BALLROOM

Michelle Zbylut, PhD
Director, Army Research Institute
Moderator

Mark Draper
Lead, Adaptive Warfighter Interfaces Core Technical Competency, Air Force Research Laboratory
SI&CP Government Co-Chair, Human Systems Division, NDIA

Michael LaFiandra, PhD
Branch Chief, Dismounted Warrior Branch
PS&WP Government Co-Chair, Human Systems Division, NDIA

Kendy Vierling, PhD
Deputy Assistant Chief of Staff, Training and Education Command, U.S. Marine Corps
PAE&T Government Co-Chair, Human Systems Division, NDIA

11:15 – 11:20 am

INTRODUCTION TO TECHNICAL SESSIONS
SOUTH BALLROOM

Jim McCarthy, PhD
Vice President, Instructional Systems, Sonalysts, Inc.
Chair, Human Systems Division, NDIA

SESSION 1: PERSONALIZED ASSESSMENT, EDUCATION, & TRAINING

11:20 – 11:25 am

INTRODUCTION TO SESSION
SOUTH BALLROOM

Kendy Vierling, PhD
Deputy Assistant Chief of Staff, Training and Education Command, U.S. Marine Corps
PAE&T Government Co-Chair, Human Systems Division, NDIA

11:25 – 11:45 am

DATASIM: The Data and Training Analytics Simulated Input Modeler
Shelly Blake-Plock
Chief Executive Officer, Yet Analytics, Inc.

11:45 am – 12:05 pm

Achieving & Sustaining Optimal Human Performance in High-Risk Environments
Michael Hirsch
President, Assessment Technologies

12:05 – 12:25 pm

Holistic Human Performance Training Combined with Neurotechnology Enhances Performance Potential in AETC and U.S. Army "Training Next" Programs
Frances MacInnes
Manager, Research & Innovation, Faubert Applied Research Centre

Secondary Author: Tyler Masters, PhD

12:25 – 12:45 pm

Getting the Right Data: Implementing Squad Level Shooting and Communication Measures without Overburdening the Soldier
Eric Sikorski, PhD
Director, Programs & Research, Quantum Improvements Consulting

Secondary Authors: Amanda van Lamsweerde, PhD, and Kati Anglin

12:45 – 1:05 pm

AI-Based Performance Assessment and Precision Learning for Aegis
Janet Spruill
Vice President, Aptima, Inc.

1:05 – 2:35 pm

NETWORKING LUNCH & POSTER AND DEMO SESSION
NORTH BALLROOM

2:35 – 3:20 pm

FEATURED SPEAKER
SOUTH BALLROOM

Joe Parson, Jr.
Highly Qualified Expert and Senior Technical Advisor, Synthetic Training Environment Cross Functional Team (STE CFT)

3:20 – 3:40 pm

NETWORKING BREAK
ASSEMBLY FOYER

SESSION 2: PROTECTION, SUSTAINMENT, & WARFIGHTER PERFORMANCE

3:40 – 3:45 pm

INTRODUCTION TO SESSION
SOUTH BALLROOM

Michael LaFiandra, PhD
Branch Chief, Dismounted Warrior Branch

3:45 – 4:05 pm

Developing High Performance Indicators (HPI) for Close Combat Forces Study

Rory O'Brien
Chief, Program Evaluation Office, MCoE, Maneuver Center of Excellence, U.S. Army

4:05 – 4:25 pm

In-Flight Physiological Monitoring

Lloyd Tripp, Jr., PhD, FAsMA, FAsHFA
Lead, Acceleration & Altitude Research

4:25 – 4:50 pm

CLOSING REMARKS

SOUTH BALLROOM

Nic Adams
National Security Advisor to U.S. Senator Joni Ernst (R-IA)

4:50 – 5:50 pm

NETWORKING RECEPTION

ASSEMBLY FOYER

WEDNESDAY, MARCH 4

7:00 am – 4:30 pm

REGISTRATION

ASSEMBLY FOYER

7:00 – 8:00 am

NETWORKING BREAKFAST

ASSEMBLY FOYER

8:00 – 8:15 am

WELCOME AND INTRODUCTORY REMARKS

SOUTH BALLROOM

MG James Boozer, USA (Ret)
Executive Vice President, NDIA

8:15 – 9:00 am

FEATURED SPEAKER

SOUTH BALLROOM

COL Michael McGurk, USA
Director, Research and Analysis, Directorate CIMT

9:00 – 10:30 am

PANEL: HUMAN BEHAVIOR REPRESENTATION DEFINITIONS, STANDARDS, AND REQUIREMENTS

SOUTH BALLROOM

LTC Glenn Hodges, USA
Assistant Professor and Deputy Director, Naval Postgraduate School

Karim Malek, PhD
Director and Professor, Technology Institute, University of Iowa

Joe Parson, Jr.
Highly Qualified Expert and Senior Technical Advisor, Synthetic Training Environment Cross Functional Team (STE CFT)

Jeffrey Thomas
Program Analyst, HSI, U.S. Army Headquarters Combat Capabilities Development Command (CCDC) G-5
Co-Chair, Human Systems Division, NDIA

10:30 – 11:00 am

NETWORKING BREAK
ASSEMBLY FOYER

11:00 – 11:05 am

INTRODUCTION TO TECHNICAL SESSIONS
SOUTH BALLROOM

Jim McCarthy, PhD
Vice President, Instructional Systems, Sonalysts, Inc.
Chair, Human Systems Division, NDIA

SESSION 3: SYSTEMS INTERFACE AND COGNITIVE PROCESSING

11:05 – 11:10 am

INTRODUCTION TO SESSION
SOUTH BALLROOM

Mark Draper
Lead, Adaptive Warfighter Interfaces Core Technical Competency, Air Force Research Laboratory
SI&CP Government Chair, Human Systems Division, NDIA

11:10 – 11:30 am

Prioritizing Events with Headline Visualization
John Ianni
Senior Computer Scientist, Air Force Research Laboratory

11:30 – 11:50 am

Fusing Macrocognition, Commander's Critical Information Requirements (CCIR), and System Interfaces to Facilitate Effective Decision-Making in Multi-Domain Operations
BG Jeffery Marshall, USA (Ret)
President, Morgan Works

11:50 am – 12:10 pm

Decision Support for Multi-Domain Tactical Combat Casualty Care
Christopher Nemeth, PhD
Principal Scientist, Applied Research Associates, Inc.

12:10 – 1:10 pm

NETWORKING LUNCH & POSTER AND DEMO SESSION
NORTH BALLROOM

SESSION 4: HUMAN SYSTEMS METRICS

1:10 – 1:15 pm

INTRODUCTION TO SESSION
SOUTH BALLROOM

George Salazar
Discipline Lead, Human Computer Interface Tech, Lyndon B. Johnson Space Center, NASA
A&M Government Chair, Human Systems Division, NDIA

1:15 – 1:45 pm

Assessing Cognitive Load for Quantifying Swarming Wave Glider System Usability
Andre Douglas
Section Supervisor, The John Hopkins University Applied Physics Laboratory

1:45 – 2:05 pm

Defining Realistic Human Behavior Representation in Modeling & Simulation: Leveraging Mature Technology to Inform Standards, Requirements, and Measurement Criteria
Karim Malek, PhD
Director and Professor, University of Iowa Technology Institute

2:05 – 2:35 pm

Driving Intuitive System Design with Usability Metrics

Pamela Savage-Knepshield, PhD
Research Psychologist, Combat Capabilities Development Command, Data Analysis Center

2:35 – 3:00 pm

NETWORKING BREAK

ASSEMBLY FOYER

3:00 – 4:00 pm

ROUNDTABLE/WORKING GROUP DISCUSSIONS

SOUTH BALLROOM

4:00 – 4:30 pm

ROUNDTABLE OUTBRIEF

SOUTH BALLROOM

4:30 pm

CLOSING REMARKS

SOUTH BALLROOM

Kelly Hale, PhD
Principal Member, Technical Staff, The Charles Stark Draper Laboratory, Inc.
Deputy Chair, Human Systems Division, NDIA

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POSTER AND DEMONSTRATION SESSION

TUESDAY, MARCH 3

Open all day with added viewing time from 1:05 – 2:35 pm

A Measurement Pyramid for Assessing Performance in Uncontrolled Task Environments
Lillian Asiala
Sonalysts, Inc.
James McCarthy, PhD
Sonalysts, Inc.

Demo: A Measurement Pyramid for Assessing Performance in Uncontrolled Task Environments
Lisa Bolin
SimVentions
Matt Wilson
Technology Solutions Group

Adaptive Training in the Future Army Environment
Dennis Boykin
DB4 Consulting, LLC
CSM Jeffery Stitzel, USA (Ret)
DB4 Consulting, LLC

WEDNESDAY, MARCH 4

7:00 am – 1:00 pm

Quantifying Physiologic Response to Cognitive Stress for Training Down Regulation Techniques
David Holmes, PhD
Mayo Clinic

Physiological Sensing in Action: A Step Towards Dynamic Human Performance Assessment in Multi-Domain Operations
Zachary Kiehl
Aptima

Cyber DCO Cultural Patterns and Operational Behavior
Marc Kolenko
MTSI

Developing a Cognitive Readiness Assessment, Education, and Training Framework to Enable Soldier and Leader Effectiveness in Multi-Domain Operations
Jeffery Marshall
Morgan Works

Demo: Impairment Sciences
Tim Stephens
DRUID App

Human Factors for Operational Cyber
Rachel Yang
The John Hopkins University
Applied Physics Laboratory

Dynamic Information Needs Analysis in Subterranean Environments
Farakh Zaman
University of Iowa

BIOGRAPHIES

BG STEPHEN L.A. MICHAEL, USA

Deputy Commanding General

U.S. Army Combined Arms Center – Training

BG Steve Michael was born in Guyana, South America, in 1964, immigrated to the United States in 1979, and commissioned into the Infantry in 1988. His military education includes the Infantry Officer Basic and Advanced courses, the Combined Arms and Services Staff School, and the U.S. Army Command and General Staff College. He holds a B.S. in Civil Engineering from the United States Military Academy and completed the Operations Research Systems Analysis Military Applications Course at Fort Lee, VA. He was the Senior Service College Fellow to Columbia University for FY11. Prior to serving as the Columbia Fellow, he was the Regimental Tactical Officer for 4th Regiment in the United States Corps of Cadets at West Point.

BG Michael began his career at Fort Drum as a Rifle Platoon Leader, Mortar Platoon Leader, Company Executive Officer, and then as the Battalion S4 in 2nd Battalion 87th Infantry, 2nd Brigade, 10th Mountain Division. Immediately after the Career Course, he served as the Battalion S3 for the Columbus Recruiting Battalion in Columbus, OH. Next, he served as the Battalion S4 and Charlie Company Commander for 2nd Battalion 325th Airborne Infantry Regiment, 82nd Airborne Division. He then served as the S3 for 2nd Battalion, 503rd Infantry (Airborne), 173rd Airborne Brigade. Later, he commanded 2nd Battalion, 12th Infantry Regiment at Fort Carson and 1st Brigade Combat Team, 10th Mountain Division (Light) at Fort Drum. Afterwards, BG Michael served as the Deputy Director for the Pakistan Afghanistan and Transregional Threats Coordination Cell on the Joint Staff, J5. BG Michael then served as the Deputy Commanding General for Operations, 25th Infantry Division at Schofield Barracks, Hawaii and as the G-3/5/7 for U.S. Army Pacific. Most recently, BG Michael served as the Deputy Director for Strategic Planning and Policy (J5), U.S. Indo-Pacific Command at Camp Smith, HI.

BG Michael has a diverse operational background; from Fort Drum, he took part in Operation Restore Hope in Somalia as the Battalion Logistics Officer for 2-87 Infantry. As the Commander of Charlie Company, 2nd Battalion, 325th Airborne Infantry Regiment, 82nd Airborne Division, he deployed as part of Operation Desert Focus to Dhahran, Saudi Arabia, to secure American citizens and forward deployed units in response to the Khobar Towers Bombing. As Operations Officer for 2nd Battalion, 503rd Infantry (Airborne), 173rd Airborne Brigade, in Vicenza, Italy, he deployed on two back-to-back operational missions: Operation Rapid Guardian in Kosovo and Operation Iraqi Freedom I, where the Battalion conducted a night combat parachute assault onto Bashur Drop Zone in Northern Iraq and helped secure the city of Kirkuk.

Next, as ground planner in the Southern European Task Force's Joint Planning Group with the responsibility for Sub-Saharan Africa, BG Michael deployed to Ghana and Nigeria as part of Joint Task Force Liberia to help the Economic Community of West African States stabilize Liberia as President Charles Taylor was exiled to Nigeria. He then served as Aide de Camp to Lieutenant General Kip Ward, then the Deputy Commander for United States Army Europe and 7th Army; with Lieutenant General Ward, BG Michael deployed to Israel for 10 months as part of the inaugural Israeli-Palestinian Security Coordinator Mission to help prepare the Palestinian Authority take control of Gaza.

As the Commander of 2-12 Infantry, BG Michael deployed for 15 months to Al Doura, Baghdad, as part of the surge. In 2013, BG Michael deployed as the 1st Brigade Combat Team Commander to Regional Command - East on the Security Force's Advise and Assist mission in order to enable the Afghan National Security Forces to stand up, fight, and win in Ghazni, Afghanistan. As Deputy Director for the Pakistan-Afghanistan and Transregional Threats Coordination Cells, BG Michael enabled the Chairman of the Joint Chiefs of Staff best military advice on plans and policy for Afghanistan - Pakistan and Transregional Threats. As Deputy Commander for Operations, 25th ID, BG Michael enabled the Commander, 25th ID and his subordinate Commanders to get their formations ready for the crucible of Ground Combat and Operations, Activities, and Investments throughout the Inda-Pacific. As the G-3/5n for U.S. Army Pacific, was responsible for driving and synchronizing all Army Operations, Activities and Investments and connecting the "The Network" - the operations, plans, intelligence, Component, Combined and Inter-Agency enterprise to deliver results. Similarly, he did likewise as the Deputy J5 for the Inda-Pacific Command in the areas of Strategy, Plans, & Policy.

COL MICHAEL MCGURK, USA (RET)

Director, Research and Analysis Directorate
Center for Initial Military Training, Training, and Doctrine Command, U.S. Army

Michael McGurk enlisted in 1979 in the Infantry as member of the Army National Guard, which became the start of his over 30 years of uniformed service to the nation. Michael attended and graduated from the United States Military Academy at West Point and, in 1985, commissioned Infantry. 2nd Lieutenant McGurk attended the Infantry Officers Basic Course at Fort Benning, Airborne School, Pathfinder School, in addition to U.S. Army Ranger School and other trainings. His first duty assignment was 25th Infantry, Schofield Barracks, HI.

In over 26 years as an officer, Michael served as a platoon leader, company commander, battalion adjutant, battalion executive officer, Director of Operations, Instructor, and military attaché (in Paris). During the summer of 2004, LTC McGurk deployed to Baghdad, Iraq, where he was awarded the Bronze Star for meritorious service, returning from combat in January 2005.

Colonel McGurk retired from active military service in 2011 to pursue a civilian career with the Department of Defense. Michael currently works for the Department of the Army as a the Director of Research for the U.S. Army Center for Initial Military Training at TRADOC in Fort Eustis, VA. In his current role, he is the lead for the U.S. Army for the development and fielding of the new Army Combat Fitness Test (ACFT). He directs the test implementation and standards for the entire Active Army, Army National Guard, and Army Reserve, across the globe.

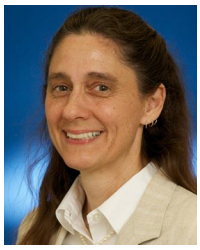
JOE PARSON, JR

Highly Qualified Expert and Senior Technical Advisor
Synthetic Training Environment Cross Functional Team

Joe Parson is a Highly Qualified Expert (HQE) assigned to the U.S. Army Futures Command Synthetic Training Environment Cross Functional Team (STE CFT) as a Senior Technical Advisor to the Director. He provides critical input in direct support of the Director's vision of enhancing realistic training to ensure readiness for units in the conduct of multi-domain operations in diverse complex operational environments. Parson is dedicated to creating an organizational climate that values each member of the team while fostering a culture of collaboration, communication, and innovation.

Parson served with distinction in the U.S. Army beginning with his enlistment in 1989 and rising to the rank of Command Sergeant Major prior to retirement in 2016. Parson served as the Command Sergeant Major and senior enlisted advisor for Leader Development & Education at the U.S. Army Combined Arms Center in Fort Leavenworth, KS. The U.S. Army Combined Arms Center, organized under the U.S. Army Training and Doctrine Command, is the Army's lead organization for doctrine, training, education, leader development, and lessons learned.

His awards and honors include the Army Civilian Commendation Medal, the Legion of Merit, two Bronze Star Medals and three Meritorious Service Medals. Parson also earned the U.S. Army Combat Action Badge and Parachutist Badge ("Jump Wings"). In addition to his numerous military awards and decorations, Parson has earned several academic degrees and industry certifications. He has earned a BS and MA in Business and Organizational Management, completed advanced leadership and training programs, and received various industry certifications.



HOLLY HANDLEY, PHD, PE

Associate Professor, Engineering Management & Systems Engineering
Old Dominion University

Dr. Holly Handley is an Associate Professor in the Engineering Management and System Engineering Department at Old Dominion University (ODU). Dr. Handley applies engineering principles and experience in computational modeling to support projects in human systems engineering research and development. She develops models and methodologies to better represent the human component of socio-technical systems. She is currently part of the committee developing HSI industry-wide standards and was also a member of the original NATO panel to develop the Human Viewpoint for system architecture development. Currently, her Human System Engineering Laboratory at ODU is investigating questions on the balance of human roles and automation and the implications for personnel capabilities and manpower requirements across systems and organizations.

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Revolutionizing training and preparation for Multi-Domain Operations through, Holistic Health and Fitness, the new Army Combat Fitness Test and other initiatives out of the Center for Initial Military Training

Mr. Michael S. McGurk
Director
Research and Analysis
U.S. Army Center for Initial Military Training - TRADOC
Fort Eustis, Virginia

michael.s.mcgurk.civ@mail.mil

USACIMT Organization

CSM USACIMT

CG, USACIMT
TRADOC DCG, IMT

MG Lonnie G. Hibbard

CSM Edward W. Mitchell

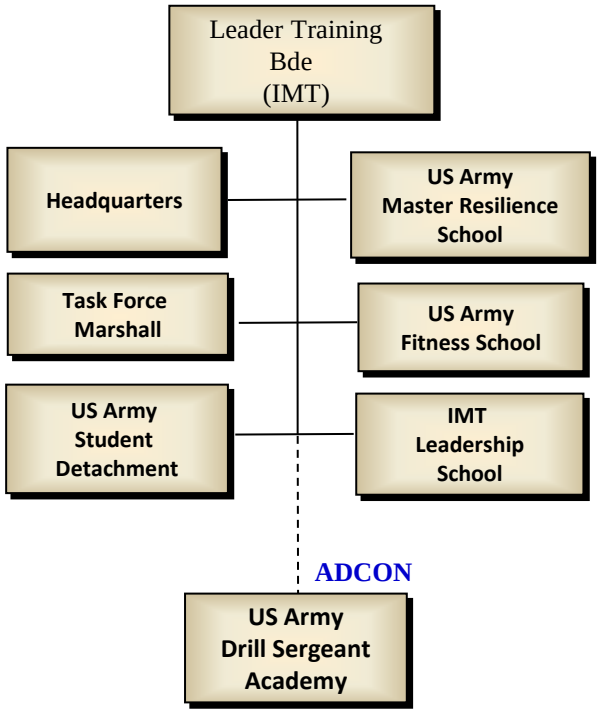
Support

- IMT Bdes
- 108th Tng Cmd
  - 95th Division
  - 98th Division
- ATC Jackson
- Chief of Staff
  - SGS
  - KM
  - CIO
  - QAO
  - Reserve Component
  - PAO
  - Chaplain
  - Leader Training Bde (IMT)
    - Headquarters
    - Task Force Marshall
    - US Army Student Detachment
    - US Army Master Resilience School
    - US Army Fitness School
    - IMT Leadership School
  - Resource, Man, Equip (G1/4/8)
  - Ops, Plans & Training (G3/5/7)
  - Research & Analysis (G2)

US Army Drill Sergeant Academy — ADCON — Leader Training Bde (IMT)

UNCLASSIFIED

Leader Training Brigade



- **US Army Physical Fitness School**
  - Master Fitness Trainer Course
  - FM 7-22, Army Physical Readiness Training
- **US Army Master Resilience School**
  - Level I and Level II courses
  - Aligned with Comprehensive Soldier and Family Fitness
  - Aligned with Ready & Resilient Campaign (R2C)
- **IMT Leadership School**
  - TRADOC IET Pre Command Course
  - TRADOC Company Cdr / First Sergeant Course
  - TRADOC cadre and staff courses
- **US Army Drill Sergeant Academy**
  - Train the Trainers
- **Task Force Marshall (Camp McCrady Training Ctr)**
  - Navy Mobilization Basic skills refresher
- **US Army Student Detachment**
  - C2 over 2600 students in Education worldwide

Where We Train

Ft Leonard Wood

1st EN Brigade
- 31st EN - OSUT
- 35th EN - OSUT
- 169th EN - AIT
  (A Co - Panama City, FL)
  (C Co - Gulfport, MS)
  (D Co - Sheppard, AFB)
  (FF Det - Goodfellow, AFB)
- 544th EN - AIT / BOLC / WOBC

3rd CM Brigade
- 2-10th IN - BCT
- 3-10th IN - BCT
- 1-48th IN - BCT
- 2-48th IN - BCT
- 58th TC – AIT (CASCOM)
- 84th CM - AIT / BOLC / WOBC

14th MP Brigade
- 1-58th IN - BCT
- 701 MP - OSUT/AIT/BOLC/WOBC
  (D Co - Lackland, AFB)
- 787th MP - OSUT
- 795th MP - OSUT
- 434th AG - RECBN

FY21 – 1 BCT BN to restation from MSCoE to FCoE

Other BOLC-A / AIT / W.O. Sites

1. Sheppard AFB, TX
2. Goodfellow AFB, TX
3. Lackland AFB, TX
4. Naval Const BN Ctr, MS
5. Pensacola, FL
6. Ft Meade, MD (15th Signal Bde)
7. Yorktown Naval Wpns Station, VA
8. Littlecreek Naval Amphibious Base, VA
9. Ft Bragg, NC (Cyops/Civil Affairs will re-station to Ft Jackson in 2020)
10. Panama City, FL
11. Eglin AFB, FL
12. Ft Rucker, AL (WOCC/WOCS)
13. West Point (USMA)
14. Ft Knox, KY (USACC/USAREC)

Ft Gordon

15th SIG Brigade
- 369th SIG - AIT
- 551st SIG - AIT
- 442nd SIG - AIT / BOLC
- OTDG - AIT / WOBC
- Cyber BN – BOLC / WOBC
- PAO Detach (Ft Meade)

Ft Eustis

128th AVN Brigade
- 1-222nd AVN - Admin Bn
- 1-210th AVN - AIT/WOBC
- 2-210th AVN - AIT

Ft Lee

23rd QM Brigade
- 244th QM - AIT
- 262nd QM - AIT
- 266th QM - AIT
  (E Co - Ft Eustis)

59th OD Brigade
- 16th OD - AIT
- 73rd OD - AIT (Eglin, AFB)
  (Detachment - Ft Sill)
  (Detachment - Ft Gordon)
- 832nd OD – AIT

Army Logistics University
- ALU Support Bn - QM/TC/OD BOLC / WOBC

Ft Jackson

165th IN Brigade
- 1-34th IN - BCT
- 1-61st IN - BCT
- 2-39th IN - BCT
- 3-34th IN - BCT
- 3-39th IN - BCT
- 4-39th IN - BCT

193rd IN Brigade
- 1-13th IN - BCT
- 2-13th IN - BCT
- 3-13th IN - BCT
- 2-60th IN - BCT
- 3-60th IN - BCT
- 120th AG - RECBN

SSI
- AG School – BOLC / WOBC / AIT
- FM School – BOLC / AIT
- School of Music - AIT/BOLC/WOBC (Littlecreek)
- Postal School
- 369th AG - AIT

Chaplain School
- AIT / BOLC

Ft Benning

194th AR Brigade
- 2-15th AR - OSUT
- 5-15th AR - OSUT
- 1-46th IN - BCT
- 2-47th IN - BCT
- 1-81st AR - OSUT / AIT
- 30th AG - RECBN

To OSUT FY20
To OSUT FY20

198th IN Brigade
- 1-19th IN - OSUT
- 2-19th IN - OSUT
- 1-50th IN - OSUT
- 2-54th IN - OSUT
- 2-58th IN - OSUT

199th IN Brigade
- 2-11th IN - BOLC
- 3-11th IN - OCS / DCC

316th CAV Brigade
- 1-16th CAV SQ - Funct
- 2-16th CAV SQ - BOLC
- 3-16th CAV SQ - Funct

Ft Sill

30th ADA Brigade
- 2-6th ADA - AIT / BOLC / WOBC / AMEDD DCC
- 3-6th ADA (Co B - AIT)

428th FA Brigade
- 2-2nd FA - Training Support
- 1-30th FA - BOLC/WOBC
- 1-78th FA - AIT

434th FA Brigade
- 1-19th FA - BCT
- 1-31st FA - BCT
- 1-40th FA - BCT
- 1-79th FA - BCT
- 95th AG - RECBN
- ESL - (Lackland, AFB)

Ft Rucker

1st AVN Brigade
- 1-13th AVN - AIT
- 2-13th AVN - AIT (Ft Huachuca)
- 1-145th AVN - BOLC/WOBC

Ft Sam Houston

32nd MED Brigade
- 232nd MED – AIT
- 264th MED – AIT

Medical Professional Tng Brigade
- 187th MED (Co A - BOLC/WOBC)
- 188th MED (Co A, B, C - AIT)

Monterey

Defense Language Institute
- 229th MI - Language

Ft Huachuca

111th MI Brigade
- 304th MI – BOLC / WOBC
- 305th MI - AIT
- 309th MI - AIT
- 344th MI - AIT (G.fellow, AFB)
  (D Co - Pensacola, FL)

RED TEXT = Alternate Site

What's the problem?

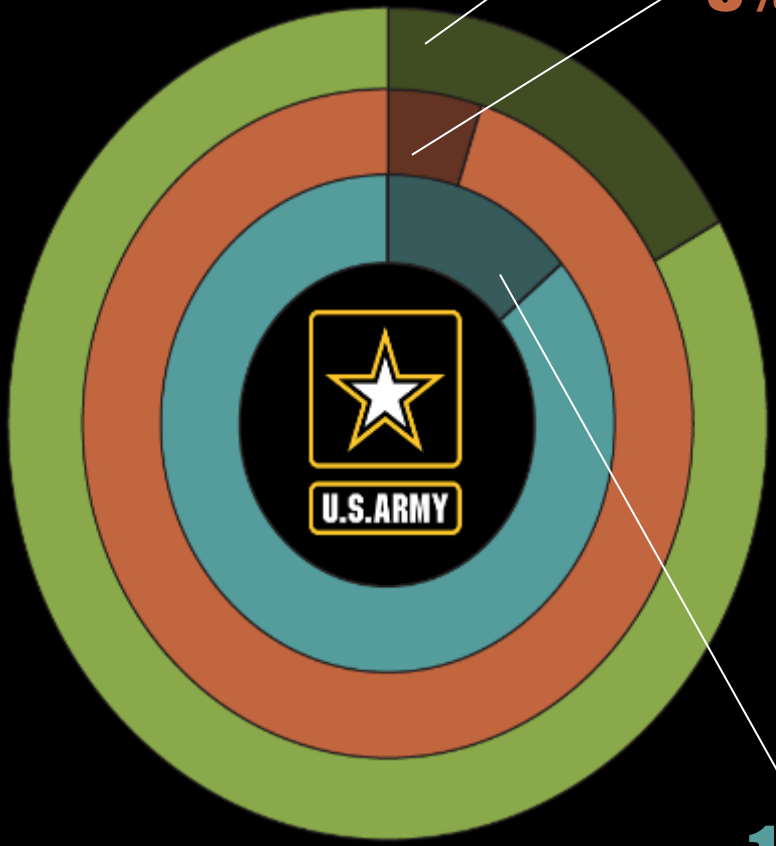
- 1 in 20 Soldiers fail APFT
- 56,000 Soldiers non-deployable
  - 4% medically non-available
  - 5% limited duty profile
- 52% of all Soldiers will experience injury this year
- 17% of AC Soldiers are obese
  - 48% more likely to experience injury
  - 86% increased chance of being medically non-available
- MSKI affects 55% of Soldiers annually
  - Equates to 10M limited duty days
  - A 1% reduction of non-available rate saves $30 million
- 31% of Soldiers who fail OPAT become injured
- 70% of people between the age of 17-24 unqualified for military service
  - 31% due to obesity

"The capacity and capability of the Soldier on today's battlefield is threatened by poor health and lack of physical readiness" GEN Milley, 39th CSA

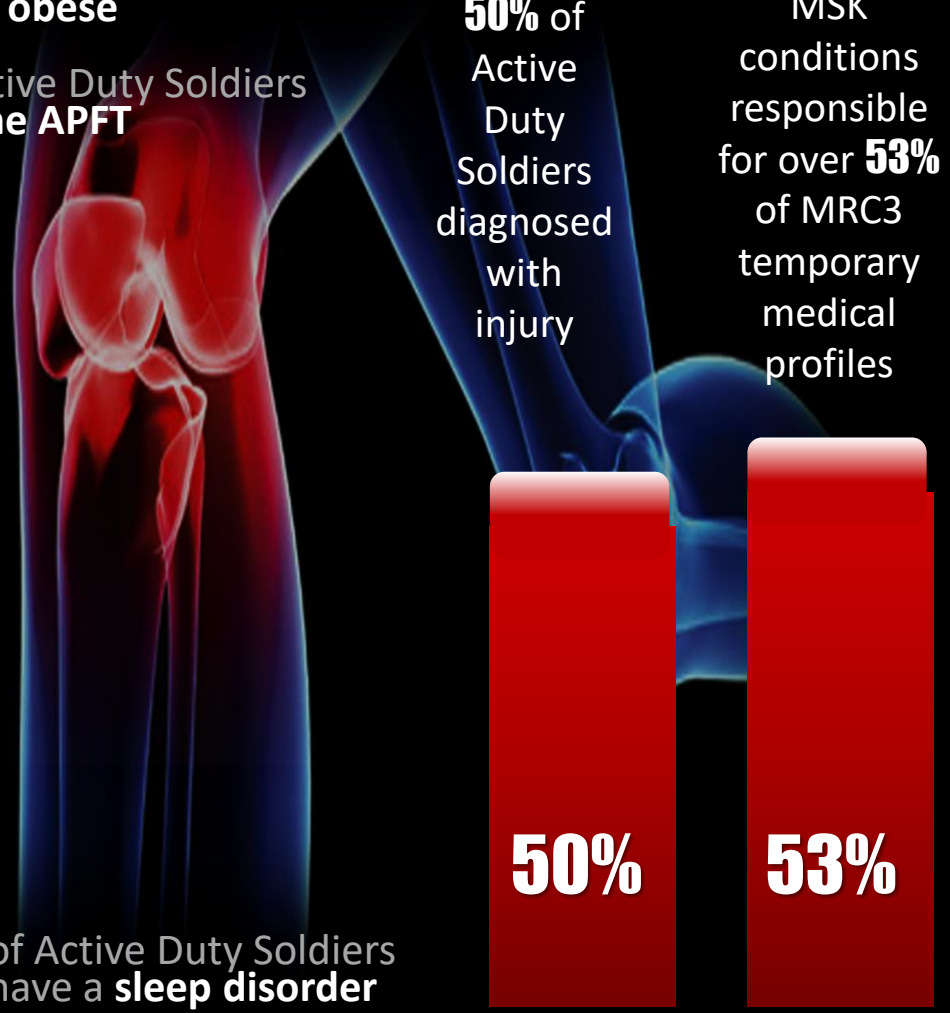
Current State of the Active Army

17% of Active Duty Soldiers are **clinically obese**

5% of Active Duty Soldiers **fail the APFT**



14% of Active Duty Soldiers have a **sleep disorder**



50% of Active Duty Soldiers diagnosed with injury

MSK conditions responsible for over **53%** of MRC3 temporary medical profiles

Army Combat Fitness Test

Profile Demographics

Percent
91--100
81--90
71--80
61--70
51--60
41--50
31--40

Gender, Age Group, Rank, and COMPO Impact on Soldier's ability to be Eligible for all Three Primary APFT Events

	MALE			FEMALE			ALL GENDER		
Age Group	USAR	ARNG	AC	USAR	ARNG	AC	USAR	ARNG	AC
<20	99.6%	99.4%	96.3%	98.1%	97.8%	86.8%	99.1%	99.0%	94.6%
20-25	97.3%	97.7%	90.8%	93.4%	91.9%	75.3%	96.4%	96.5%	88.5%
25-30	95.6%	94.2%	87.2%	89.4%	86.6%	72.2%	94.4%	92.9%	84.9%
30-35	90.5%	87.7%	82.1%	82.1%	78.3%	66.9%	88.6%	86.3%	79.8%
35-40	82.9%	80.1%	72.3%	73.1%	70.7%	58.6%	80.8%	78.8%	70.3%
40-45	75.6%	72.2%	65.6%	66.2%	63.5%	51.1%	73.7%	71.1%	63.6%
>45	66.0%	59.7%	60.1%	52.8%	50.3%	44.3%	63.4%	58.7%	57.9%
Total	89.1%	87.6%	83.7%	82.5%	84.3%	69.7%	87.7%	87.0%	81.6%
OFFICER	86.4%	88.2%	87.4%	80.0%	83.3%	77.1%	84.8%	87.4%	85.4%
ENLISTED	89.8%	87.8%	83.4%	83.2%	84.6%	68.0%	88.4%	87.2%	81.2%
WARRANT	79.8%	78.1%	73.6%	73.2%	72.8%	61.5%	78.8%	77.5%	72.4%

POC: Dr. Michael J. Carino, OTSG PA&E
Source: MODS Mainframe, 28 February 2019

There is considerable evidence that our Soldier lacks the physical conditioning and stamina we will require for the modern battlefield. We must do something about this now!

Infantry Magazine - 1958

Why Change?
Testimony from the Field

It was April 2004, the second month I was in Iraq, when I realized the physical training we had been working so hard at was truly failing us at the worst possible moment.

We were clearing houses, came under fire and had to maneuver down 75 meters in a ditch through moderate vegetation, only to come to a 5.5' wall, under full combat load.

I had never been so exhausted in my entire life, and I will never forget the feeling of collapsing at that wall, my lungs screaming for air, staring at a wall I could peer over but I couldn't get over.

Keep in mind I could roll out of bed and score a 290-310 on the APFT any day of the week.

Zach Bowen
CPT, MI, US Army Reserve
Commander, 295th Ordinance Company

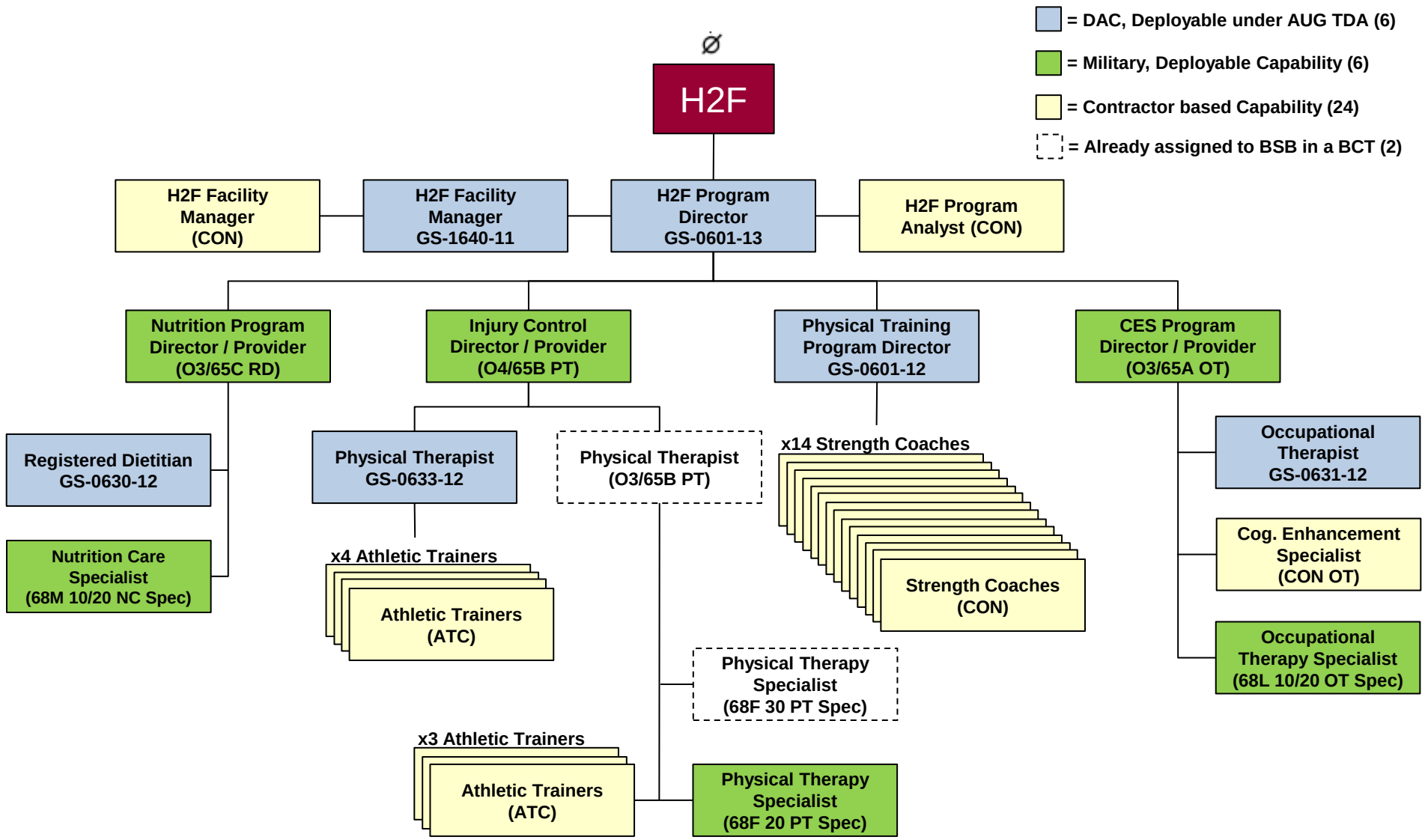
Holistic Health and Fitness

An enterprise-wide "system" that combines all aspects of physical and non-physical human performance under a single governance to enable commanders to improve Soldier health and fitness for combat.

H2F System

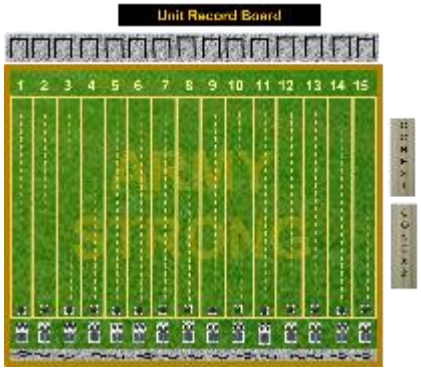
- Supports Soldiers with:
  - Expert personnel (PT, OT, Dietician, Athletic Trainer, Strength and Conditioning Specialist, Cognitive Performance Specialist)
  - Medical care
  - Equipment and facilities
  - Governance
- Trains Soldiers with individualized and periodized training plans
- Provides comprehensive, integrative, and immersive holistic approach to Soldier readiness
- Based upon comprehensive and evaluated scientific research

Personnel

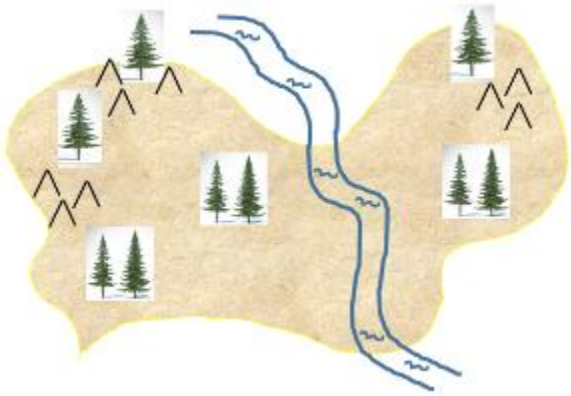

= DAC, Deployable under AUG TDA (6)
= Military, Deployable Capability (6)
= Contractor based Capability (24)
= Already assigned to BSB in a BCT (2)
H2F
H2F Facility Manager (CON)
H2F Facility Manager GS-1640-11
H2F Program Director GS-0601-13
H2F Program Analyst (CON)
Nutrition Program Director / Provider (O3/65C RD)
Injury Control Director / Provider (O4/65B PT)
Physical Training Program Director GS-0601-12
CES Program Director / Provider (O3/65A OT)
Registered Dietitian GS-0630-12
Nutrition Care Specialist (68M 10/20 NC Spec)
Physical Therapist GS-0633-12
Physical Therapist (O3/65B PT)
x4 Athletic Trainers
Athletic Trainers (ATC)
x3 Athletic Trainers
Athletic Trainers (ATC)
Physical Therapy Specialist (68F 30 PT Spec)
Physical Therapy Specialist (68F 20 PT Spec)
x14 Strength Coaches
Strength Coaches (CON)
Occupational Therapist GS-0631-12
Cog. Enhancement Specialist (CON OT)
Occupational Therapy Specialist (68L 10/20 OT Spec)

Holistic Health & Fitness (H2F)

H2F Campus Concept



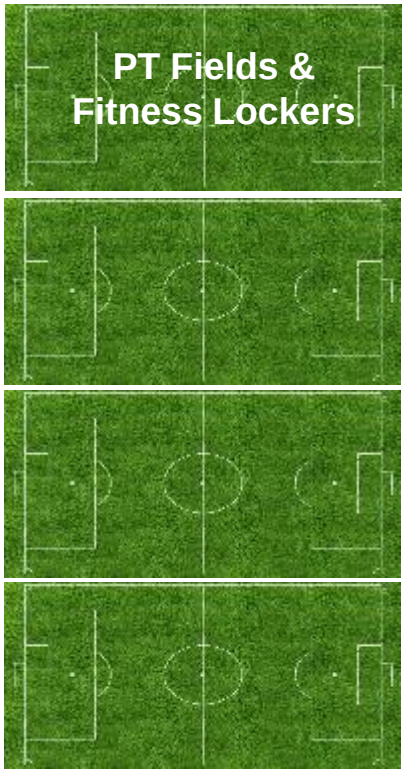
ACFT Test Site



Terrain Run Park

Obstacle Course



Example Soldier Performance Readiness Center (SPRC)

Soldier Performance Readiness Center (SPRC)

Zone 0	- Prep / Warm-up Area
Zone 1	- Resistance Training
Zone 2	- Accessory Training
Zone 3	- Work Capacity / Agility Training
	- Rehabilitation / Recondition Area
	- Admin / Classroom /Team room

Facility Design Standards

x3 Facility Sizes
- BN (~21,000 SF)
- BDE (~42-43,000 SF)

x3 Distinct Training Zones
- Resistance Training
- Accessory Training
- Work Capacity / Agility Training

x2 Classrooms (25 PAX each)
X1 Rehabilitation/Reconditioning Area
x1 Cognitive Training Area

Holistic Health and Fitness (H2F)

Occupational Physical Assessment Test (OPAT)

Holistic Health & Fitness

Occupational Physical Assessment Test

The Occupational Physical Assessment Test (OPAT) is a four (4) event test, given at the point of accession (i.e. recruiting centers, ROTC detachments, U.S. Military Academy, and Officer Candidate School) to determine if the recruit meets the MOS pre-training standard for fitness.

Given prior to initial military training, the applicants may re-test as many times as needed but must meet standard 90 days before shipping to training.
Fitness to Train, not Fitness to Serve

Required for all accessions as of 3 JAN 17

OPAT Standards by Physical Demand

Pre-training level of fitness

Heavy Physical Demand

Frequently / Constantly lift 41 lbs and above or any Frequent , Constant tasks 100 lbs or more with Occasional tasks over 100 lbs.

BLACK - High Physical Demand		
Standing Long Jump	160cm	5'3"
Seated Power Throw	450cm	14'9"
Strength Deadlift	160lbs	
Interval Aerobic Run	43 shuttles (6-2)	

Military Occupational Specialties

Infantry, Armor, Motor Transport Operator, Cavalry Scout, Armor Crew Member, and others

Significant Physical Demand

Frequently / Constantly lifts 41lbs-99lbs; with or without Occasional tasks up to 100 lbs

GRAY – Significant Physical Demand		
Standing Long Jump	140cm	4'7"
Seated Power Throw	400cm	13'1"
Strength Deadlift	140lbs	
Interval Aerobic Run	40 shuttles (5-8)	

Rocket System Crew Member, Military Police, Combat Medic, Watercraft Engineer, Petroleum Supply Specialist, Wire Systems Installer, and others

Moderate Physical Demand

Frequently / Constantly lifts up to 40 lbs or when all physical demands are occasional

GOLD – Moderate Physical Demand		
Standing Long Jump	120cm	3'11"
Seated Power Throw	350cm	11'6"
Strength Deadlift	120lbs	
Interval Aerobic Run	36 shuttles (5-4)	

Plumber, Dental Specialist, Pharmacy Specialist, Ammunition Specialist, Tracked Vehicle Repairer, Logistical Specialist, Air Traffic Control Repair Specialist, Fire Control Repairer, and others

Currently Unprepared to meet Physical Demands / Unprepared to Ship to Training - WHITE

Holistic Health and Fitness (H2F)

Army Combat Fitness Test (ACFT)

ACFT

Purpose: Assess a Soldier's physical performance capability within components of combat fitness

Objectives

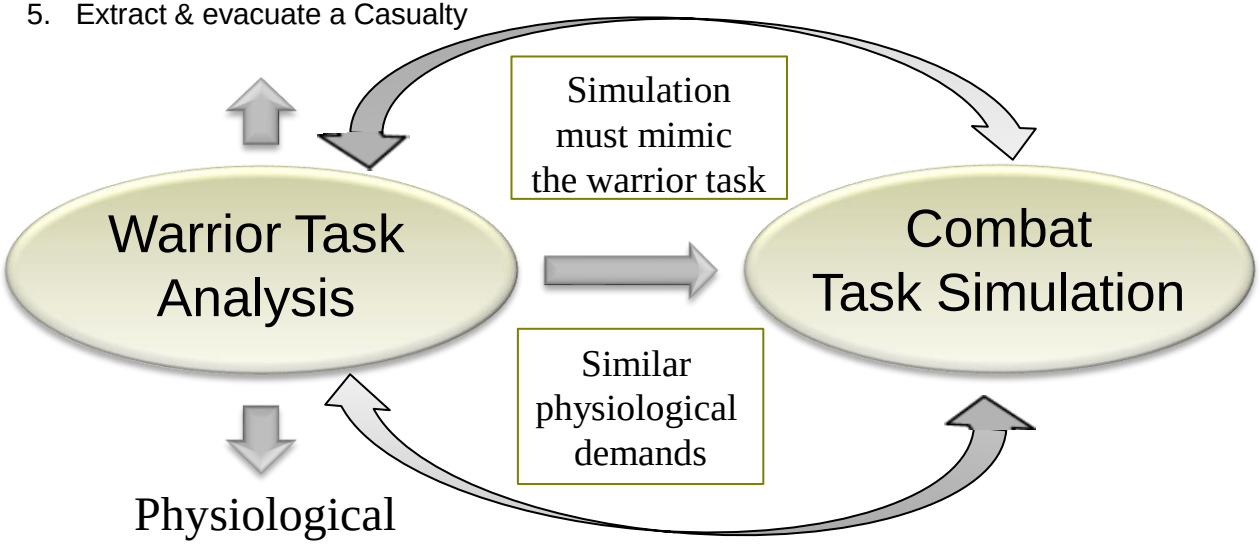
1. Improve individual Soldier readiness
2. Transform the culture of Army fitness
3. Reduce preventable injuries and attrition
4. Enhance mental toughness and stamina
5. Contribute to increased unit readiness

ACFT scoring is both gender and age neutral

Criterion Validation

Identify HPDT tasks:

1. Movement to Contact
2. Build Fighting Position
3. Move O/U/A/T in Urban Terrain
4. React to man-on-man contact
5. Extract & evacuate a Casualty



Predictive Tests:
must successfully predict task simulation performance

- **Muscular Strength**
- **Muscular Endurance**
- **Explosive Power**
- **Speed / Agility**
- **Aerobic Endurance**

WTBD/CST Word Pictures

Move Over, Under, Around, and Through Obstacles




Task:	Move Over, Through, and Around Obstacles
Condition:	Wearing 80 lb Fighting Load, if necessary, equipment may be removed, but must be worn/carried after obstacle is cleared
Standard:	Obstacles successfully negotiated, without assistance

Scenario

Soldier with an 80 pound Fighting Load executes 9 skills: (1) sprints 10m, (2) low crawls 10m, (3) zig/zag run 30 m jumping over 2 low obstacles and negotiating 8 tires, (4) traverses platform with load, (6) high craw negotiates 3-high, 2-low obstac is 3 minutes.

Prepare a Fighting Position


Task:	Prepare a Fighting Position
Condition:	Wearing/carrying 80 lb Fighting Load, ground-level on sand or soil
Standard:	Dig/fill 2-4gal containers with sand and transfer 5m to 2-55gal containers until they are full. Lift/carry/stack 16 sandbags

Scenario

Soldier with 80-pound Fighting Load prepares temporary fighting position. Soldier uses E-tool and digs from the bent or stooped position, to fill two her weighing 40 lbs when full. Soldier transfers sand to a 55gal ey are full. Soldier then lifts/carries 16 40lb sand bags and a 30" platform to build a 4x4 sandbag wall. Time to completion


Conduct Tactical Foot March


Task:	Conduct a 16 km tactical foot march
Condition:	Wearing/carrying 128-pound Approach March load
Standard:	Complete in 4 hours

Scenario

Soldier conducts a 16 km tactical foot march in 4 hours while carrying a 128 pound load. That equates to 10 miles in 4 hours, or a 2.5 miles-per-hour pace, under a 128 pound load.


Close Hold / Pre-decisional / For Official Use Only

Casualty Extraction – Drag to




Task:	Drag a Casual
Condition:	Wearing/carry course, non-re
Standard:	Extricate and Load) non-resp

Wearing an 80-pound Fighting safety and sprints 15m. Soldie to a disabled HUMVEE with a 220lb casualty belted into the drivers seat. Soldier removes the casualty from the HUMVEE executing a controlled lowering to the ground and grabs pull strap on casualty's pack, rises to crouched position, and uses two hands to drag the casualty 30 meters to safety. Time to completion is 2 minutes.

n-to-Man Contact

orm Combatives)

	Perform Combatives
	Wearing/carrying 80-lb load, unobstructed push-course.
	Execute three basic physical tasks that simulate the strength and power required to perform combatives

Scenario

r Soldier executes the four physical tasks that simulate the strength/power required to perform combatives: 1) close to contact, (2) take your opponent to the ground, (3) disable/kill your opponent.



Warrior Tasks and Battle Drills Simulation Test

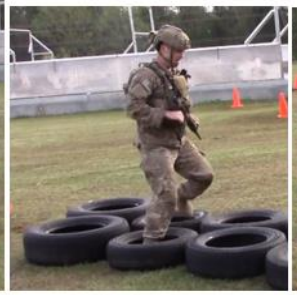
1- Movement to contact



2- Build a hasty fighting position


3- Move over-under-around-through obstacles on uneven terrain





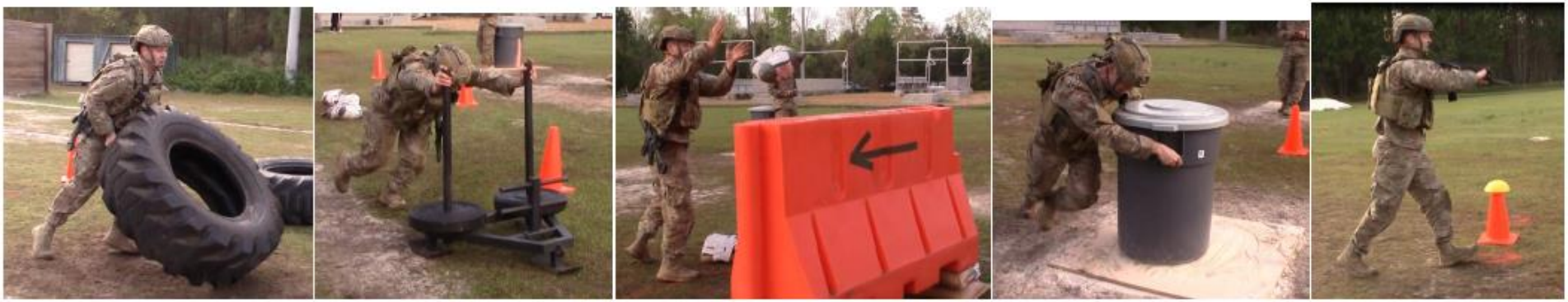






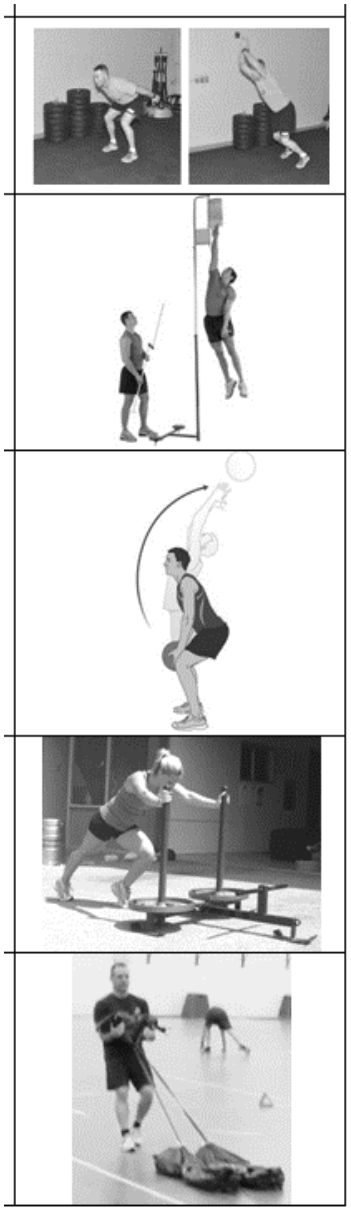
WTBD Simulation Test con't

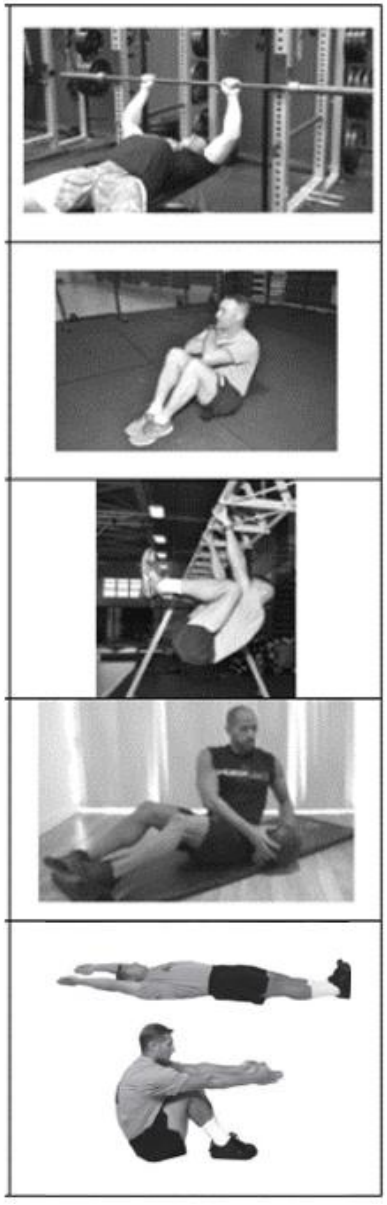
4. Employ progressive levels of strength / power (man-man contact)

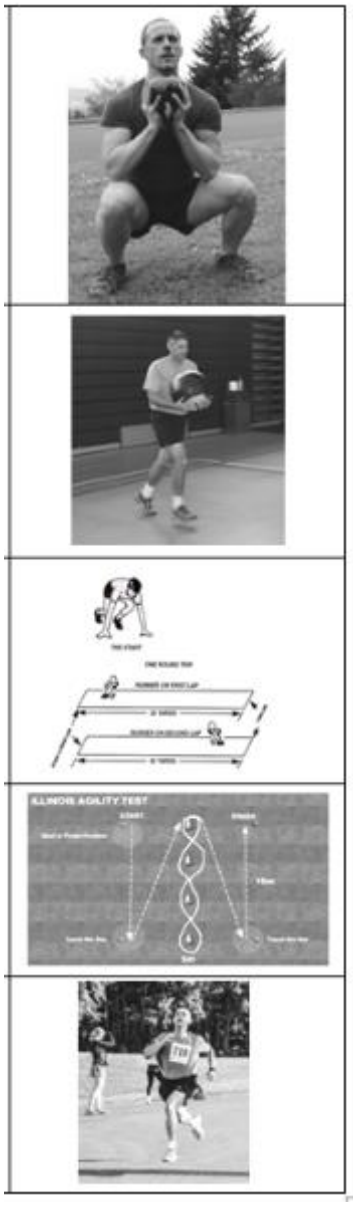


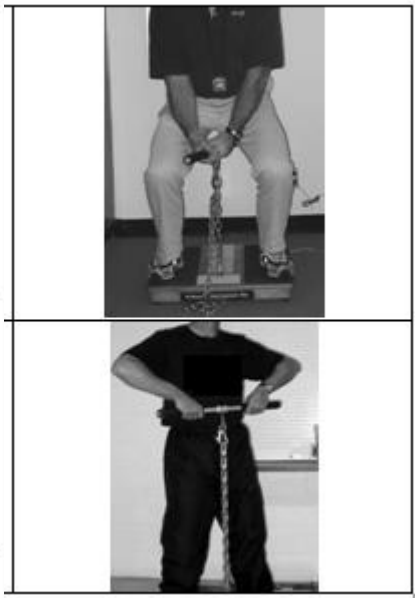
5. Extract – Evacuate a casualty

Physical Capacity Predictor Tests









+ APFT Scores from unit DD 705

Question #1: What are the physical fitness constructs of combat

Muscular Strength

Lift, carry, drag heavy loads




Speed - Agility

Move quickly over, under, around, through obstacles




Muscular Endurance

Work for long periods of time




Aerobic Endurance

Move for long distances over uneven terrain under load

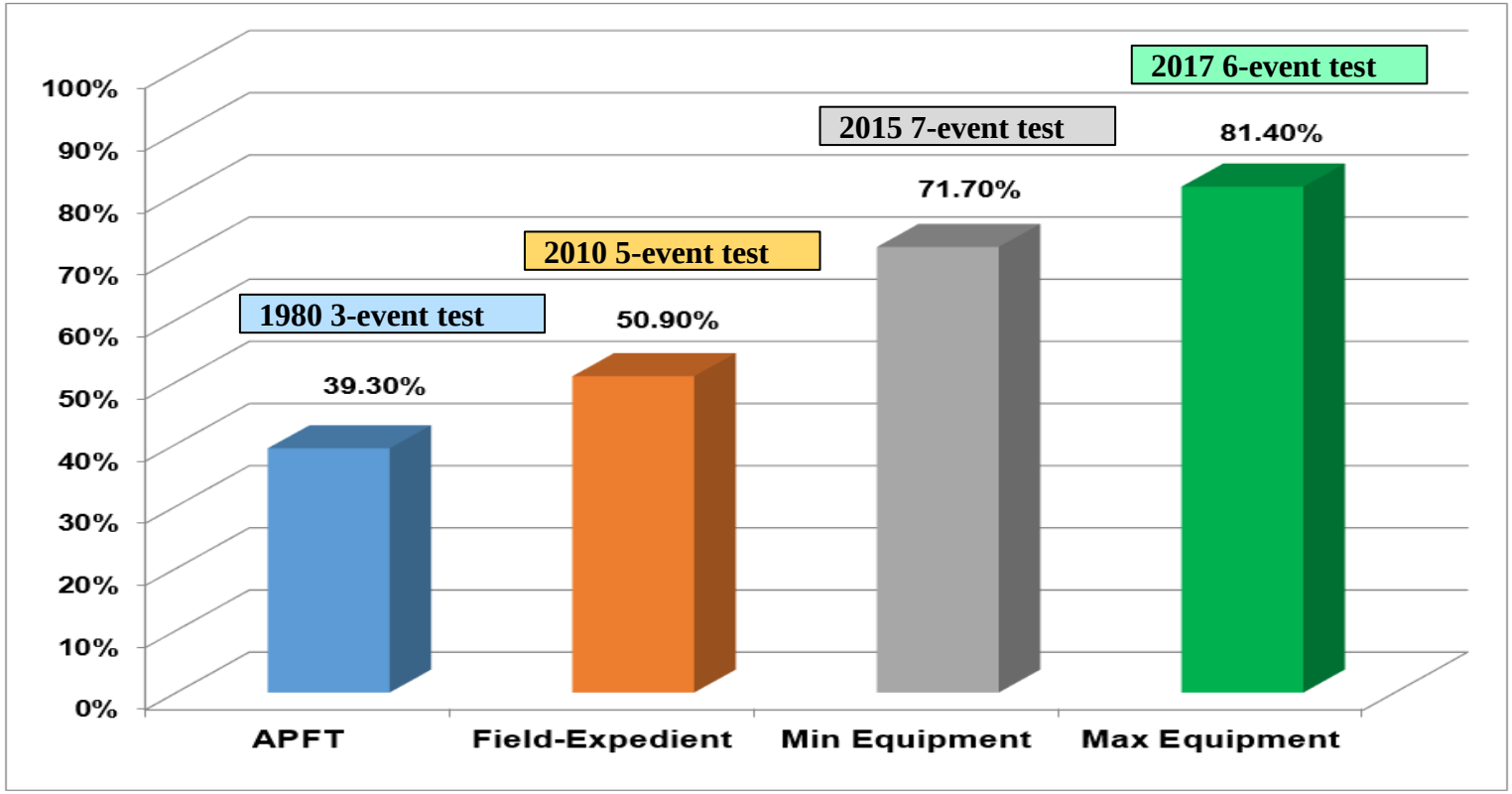



Explosive Power

Generate and apply force



Question #3: What events are better predictors of WTBD-ST performance



1980 3-event test	2010 5-event test	2015 7-event test	2017 6-event test
Push-up	Push-up	Push-up	T Push-up
2-mile Run	2-mile Run	2-mile Run	2-mile Run
Sit-up	Rower	300m Shuttle	Sprint-drag-carry
	300m Shuttle	Deadlift	Deadlift
	Standing LJ	Power Throw	Power Throw
	Pull-up	Leg Tuck	Leg Tuck
		Power Drag	

Army Combat Fitness Test

Test Execution

#1 3RM Deadlift

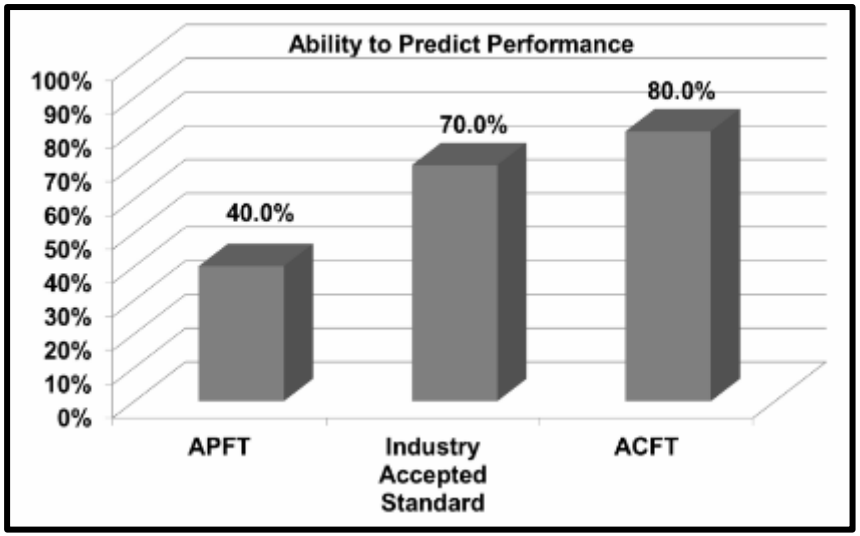
#2 Standing Power Throw

#3 Hand Release Push-Up

#4 Sprint, Drag, Carry

#5 Leg Tuck

#6 2.0-Mile Run

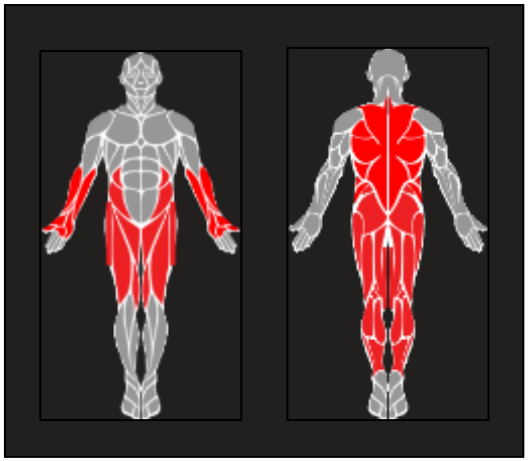


ACFT Admin Considerations

1. Even number lanes
2. CO-sized element – 16 lanes
3. OIC / NCOIC selection
4. 1-grader per lane
5. Transition to the SPT

Army Combat Fitness Test

3 Repetition Maximum Deadlift



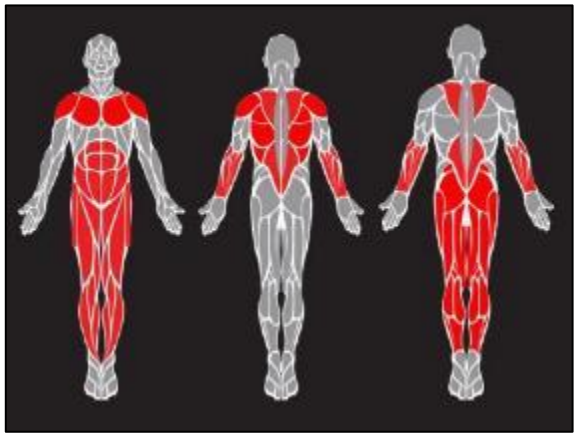
- **Task:** Execute the 3 repetition maximum (RM) deadlift event to assess lower-body strength
- **Condition:** Given a hexbar, weight plates, and barbell collars totaling up to 460lbs in an outdoor or indoor testing environment
- **Standard:** Within five (5) minutes, conduct three (3) repetitions of the MDL maintaining proper lifting form throughout the movement IAW FM 7-22, App A to meet the ACFT scoring standards
- **Component of Fitness: Muscular Strength**
  - Definition: the maximum amount of force that can be generated by a muscle or muscle group
  - Secondary Component of Fitness: flexibility
  - Anatomical Focus: knee extension, hip extension, grip, lower back
- **Application to Common Soldier Tasks (CST)**
  - Lifting heavy loads off the ground; casualty extraction/evacuation; carrying/transporting heavy loads (155mm artillery rounds, ammo boxes, etc.)

- **Relevant Principles for Event Selection**
  1. Efficacy: Highly predictive test to assess for lower body / core muscular strength
  2. Safety: Hexbar (vs Olympic bar) provides better anatomical position for proper lifting – controls for injury
  3. Ease of Administration: Requires one (1) grader per lane; event time ~5:00 min per Soldier
  4. Grading: Simple to grade, replicate over time/space

Army Combat Fitness Test

ACFT – Standing Power Throw (SPT)

- **Task:** Execute the SPT event to assess upper and lower body explosive power
- **Condition:** Given a 10lb medicine ball and tape measure in an outdoor or indoor testing environment
- **Standard:** Within three (3) minutes, conduct one (1) practice and two (2) record SPTs using proper movement technique IAW FM 7-22, App A to meet the ACFT scoring standards
- **Component of Fitness: Explosive Power**
  - Definition: generating maximal force in the shortest time
  - Secondary Component of Fitness: balance, coordination, flexibility
  - Anatomical Focus: knee extension, hip extension, grip, lower back
- **Application to Common Soldier Tasks (CST)**
  - Mounting obstacles or vehicles; lifting Soldiers up/onto/over obstacles or vehicles; lifting loads off the ground and up/onto a vehicle or platform; jumping, leaping, climbing over obstacles; throwing a grenade



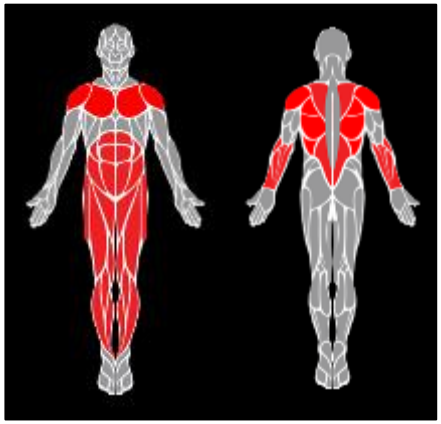
- **Relevant Principles for Event Selection**
  1. Efficacy: Highly predictive test assessing upper and lower body power required for Common Soldier Tasks (CSTs); strong driver for upper and lower body power training
  2. Safety: A "prepatory drill" and 50% effort practice throw prior to event mitigates risk of injury
  3. Ease of Administration: Requires one (1) grader and one (1) marker per lane; event time ~3:00 min per Soldier
  4. Grading: Simple to grade, replicate over time/space

Army Combat Fitness Test

ACFT – Hand Release Push-Up (HRPU)





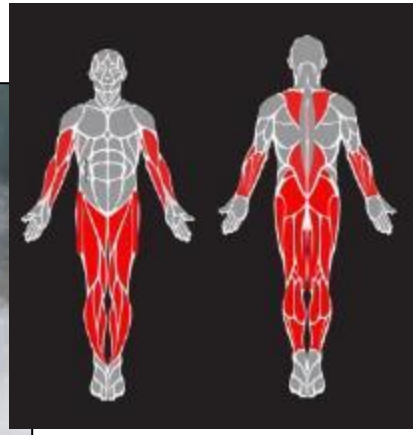


- **Task:** Execute the timed HRPU (Arm Extension) event to assess muscular endurance
- **Condition:** Given a stopwatch in an outdoor or indoor testing environment
- **Standard:** Conduct as many repetitions as possible in two (2) minutes utilizing proper movement technique IAW FM 7-22, App A to meet the ACFT scoring standards
- **Component of Fitness: Muscular Endurance**
  - Definition: the ability of a muscle or muscle group to repetitively perform work for an extended period of time to volitional fatigue
  - Secondary Component of Fitness: flexibility
  - Anatomical Focus: elbow extension, shoulder flexion and extension
- **Application to Common Soldier Tasks (CST)**
  - Pushing loads up/onto/over obstacles; employing progressive levels of force; load carriage; dynamic balance under load

- **Relevant Principles for Event Selection**
  1. Efficacy: Better predictive test assessing upper body endurance than the current APFT push-up; strong driver for upper body/core strength training
  2. Safety: Minimal risk for injury with proper training program
  3. Ease of Administration: Requires one (1) grader per lane; event time = 2:00 min per Soldier
  4. Grading: Simple to grade, replicate over time/space

Army Combat Fitness Test

ACFT – Spring, Drag, Carry (SDC)



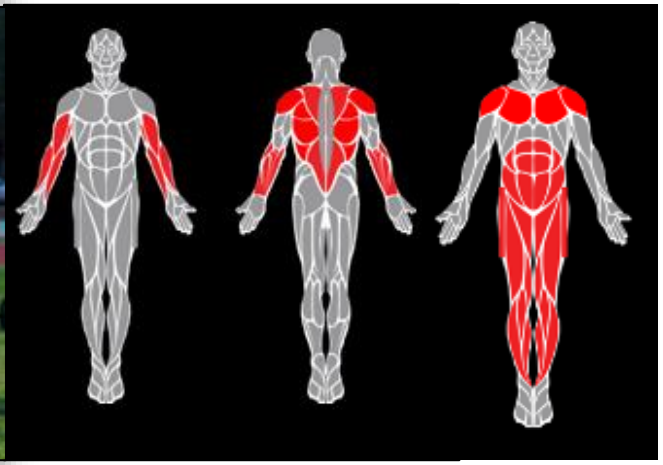
Relevant Principles for Event Selection

1. Efficacy: Highly predictive test assessing anaerobic power and endurance; strong driver for high intensity anaerobic training
2. Safety: Minimal risk for injury with proper training program; lateral shuttle in lap three (3) reduces the fall risk linked with lower leg muscle fatigue
3. Ease of Administration: Requires one (1) grader and one (1) lane safety per two (2) lanes; event time ~4:00 min per Soldier
4. Grading: Simple to grade, replicate over time/space

- **Task:** Execute the timed SDC event to assess muscular strength and endurance, and anaerobic power and endurance
- **Condition:** Given a 25m lane, one (1) drag sled, two (2) 45lb weight plates, two (2) 40lb kettlebells, and a stopwatch in an outdoor or indoor testing environment
- **Standard:** Within four (4) minutes, conduct five (5) x 50m shuttles for time in the following order – 50m sprint, 50m sled drag, 50m lateral shuttle, 50m kettlebell carry, 50m sprint IAW FM 7-22, App A
- **Component of Fitness: Muscular Endurance and Strength, Anaerobic Power, Anaerobic Endurance**
  - Definition: sustained moderate to high intensity muscular work over short duration
  - Secondary Component of Fitness: reaction time, coordination, agility, balance, flexibility
  - Anatomical Focus: knee extension, hip extension, grip, lower back, shoulders
- **Application to Common Soldier Tasks (CST)**
  - Moving quickly over uneven terrain under load; moving over/around/through obstacles; casualty extraction/evacuation; moving supplies or ammunition; 3-5 second rushes

Army Combat Fitness Test

ACFT – Leg Tuck (LTK)



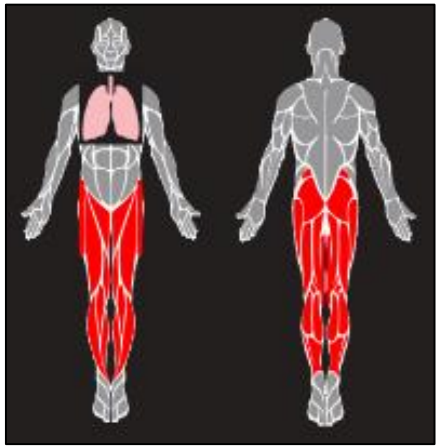
Relevant Principles for Event Selection

1. Efficacy: Highly predictive test assessing upper body/grip/core strength and endurance; greater functionality compared to alternative events; improves dynamic balance and mobility; contributes significantly to the prevention of over-use load carriage injuries
2. Safety: Minimal risk for injury since the Soldiers feet/legs remain under the base of support
3. Ease of Administration: Requires one (1) grader per lane; event time ~2:00 min per Soldier
4. Grading: Simple to grade, replicate over time/space

- **Task:** Execute the LTK event to assess muscular endurance
- **Condition:** Given a 7.5ft high x 5ft wide pull-up bar or climbing pod in an outdoor or indoor testing environment
- **Standard:** Within two (2) minute, conduct as many LTKs as possible utilizing proper movement technique IAW FM 7-22, App A to meet the ACFT scoring standards
- **Component of Fitness: Muscular Endurance**
  - Definition: the ability of a muscle or muscle group to repetitively perform work for an extended period of time to volitional fatigue
  - Secondary Component of Fitness: flexibility
  - Anatomical Focus: knee flexion, hip flexion, grip, abdominals
- **Application to Common Soldier Tasks (CST)**
  - Climbing up/onto/over vehicles or obstacles; traversing rope/ladder bridges; load carriage; dynamic balance under load

Army Combat Fitness Test

ACFT – 2-Mile Run (2MR)



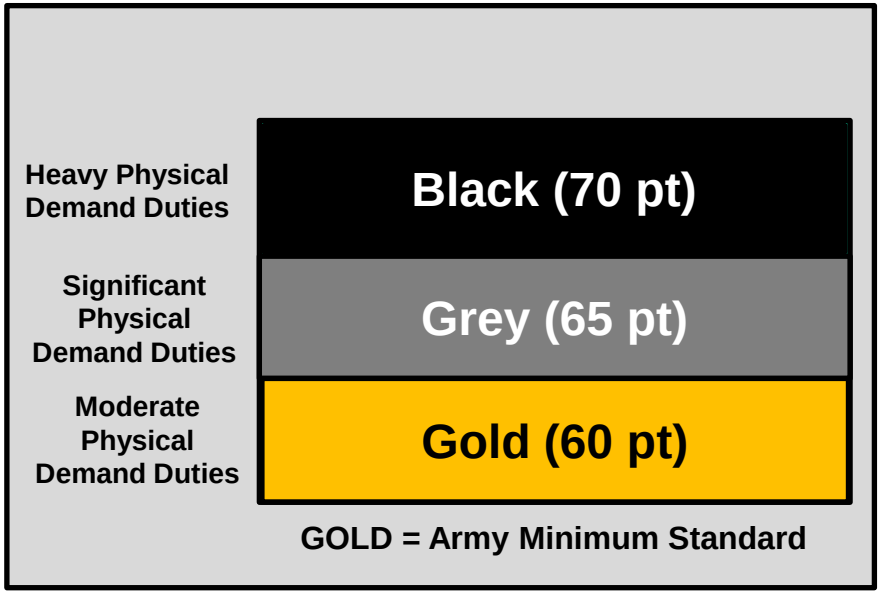
- **Task:** Execute a timed 2MR to assess aerobic endurance
- **Condition:** Given a measured and generally flat, outdoor 2.0-mile course and stopwatch or outdoor race clock
- **Standard:** Execute the timed 2MR utilizing proper running skill IAW FM 7-22, App A to meet the ACFT scoring standards
- **Component of Fitness: Aerobic Endurance**
  - Definition: the ability to exercise large muscle groups at a level somewhere between moderate and high intensity for more than a few minutes
  - Secondary Component of Fitness: None
  - Anatomical Focus: knee flexion-extension, hip flexion-extension
- **Application to Common Soldier Tasks (CST)**
  - Moving long distances over uneven terrain under load; recovery from high intensity movements such as 3-5 second rushes; movement under fire

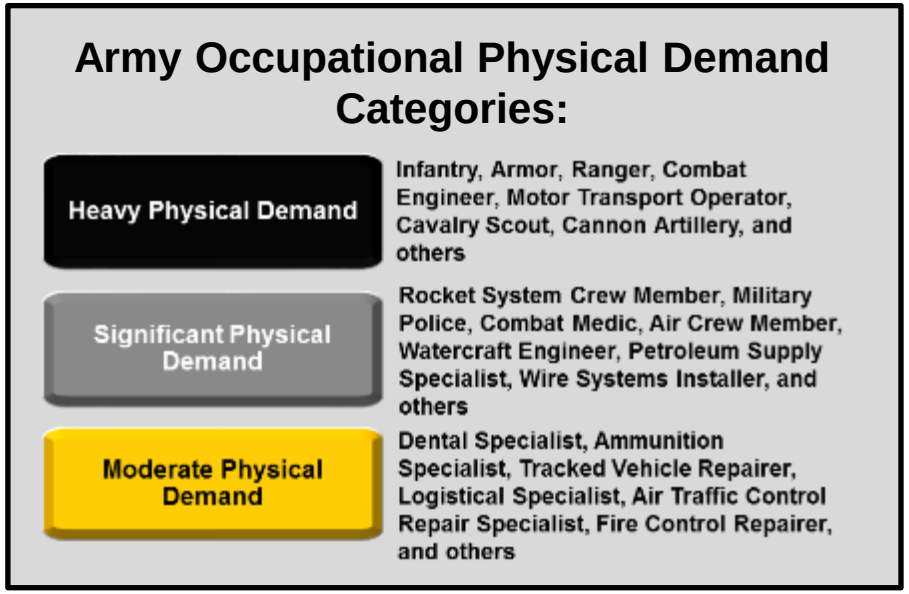
- **Relevant Principles for Event Selection**
  1. Efficacy: Highly predictive test assessing for measuring aerobic endurance
  2. Safety: Minimal risk for injury
  3. Ease of Administration: Requires one (1) grader per course; separate 2MR graders are authorized; event time ≤ 21:07 min per Soldier
  4. Grading: Simple to grade, replicate over time/space

Army Combat Fitness Test
Scoring Standard

Scoring Category Principles

1. **Based on requirements by unit and/or individual occupational physical demands**
2. **Maintains occupational fitness requirements for close combat battalion and below units regardless of age or gender (Black & Grey categories)**



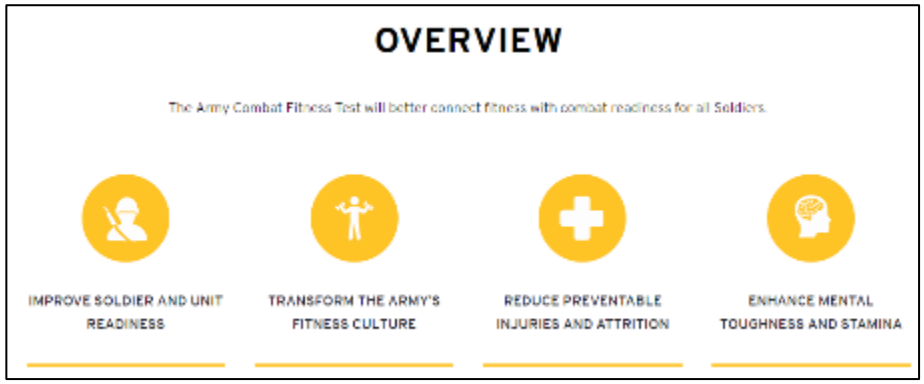


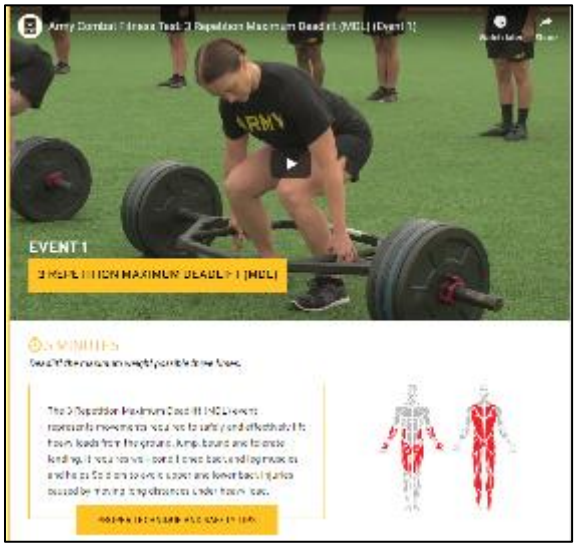
National Defense Authorization Act (NDAA) – 2015

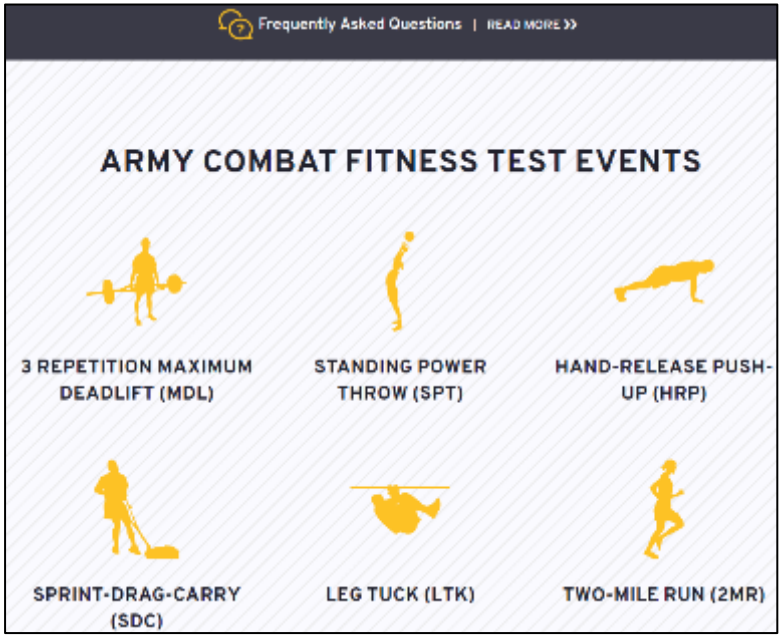
GENDER-NEUTRAL OCCUPATIONAL PERFORMANCE STANDARDS: "…the Secretary of Defense – (1) shall ensure that **qualification of members of the Armed Forces for, and continuance of members of the Armed Forces in, that occupational career** field is evaluated on the basis of common, relevant performance standards, **without differential standards or evaluation on the basis of gender**."

Army Combat Fitness Test
ACFT Guidance and Resources

Web Link: www.army.mil/ACFT







Plus ça change, plus c'est la même chose

…statistics show that one-third of our young manhood had physical defects which rejected them from the Army in spite of the fact that the standards were not high. Most of these had but recently left school. It demonstrated that something was wrong; that the schools were not preparing the youth physically for life.

Besides physical unfitness it was discovered also in Army camps that our young people were physical illiterates. It was realized that the public schools are responsible for physical literacy as well as for mental literacy. Men in camps could not jump eight-foot trenches nor vault four-foot fences. They lacked ability and skill to handle their bodies in emergencies as well as in games. There was a lack of neuromuscular skill. We needed physical education to train the body to act, as well as mental education to train the mind to think.

School health examinations and statistics over the country have indicated that more than 70 percent of the school children have defects which affect their mental as well as physical growth and development. It is recognized that a physically fit person is more likely to be efficient, happy, and useful. A physically fit nation is better prepared to meet any emergency either from within or without.

Journal of Health, Physical Education, Recreation, Volume 9
E.D. Mitchell, Editor
American Assoc. for Health and Physical Education
(Jan 1938)

Opportunities for Health and Fitness Specialists:

- Physical Therapists
- Registered Dietitians
- Occupational Therapists
- Athletic Trainers
- Strength and Conditioning Specialists
- Cognitive Enhancement Specialists

Opportunities for Equipment and Facilities:

- Lifting, Aerobic, Non-Aerobic, Rehab
- Training equipment
- Building, facilities, sites

Opportunities for Training and Management:

- IT systems, APPs, Database
- Tracking
- Training Programs

Opportunities for Research and Development:

- Individual, male/female
- Nutrition, supplements, diet
- Physical fitness, training methodology, equipment testing

Holistic Health & Fitness

Points of Contact

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Questions?

Army Combat Fitness Test
IOC Scoring Standard

ACFT FOC SCALE (Final)

Points	MDL	SPT	HRP	SDC	LTK	2MR
100	340	12.5	60	1:33	20	13:30
99		12.4	59	1:36		13:39
98		12.2	58	1:39	19	13:48
97	330	12.1	57	1:41		13:57
96		11.9	56	1:43	18	14:06
95		11.8	55	1:45		14:15
94	320	11.6	54	1:46	17	14:24
93		11.5	53	1:47		14:33
92	310	11.3	52	1:48	16	14:42
91		11.2	51	1:49		14:51
90	300	11.0	50	1:50	15	15:00
89		10.9	49	1:51		15:09
88	290	10.7	48	1:52	14	15:18
87		10.6	47	1:53		15:27
86	280	10.4	46	1:54	13	15:36
85		10.3	45	1:55		15:45
84	270	10.1	44	1:56	12	15:54
83		10.0	43	1:57		16:03
82	260	9.8	42	1:58	11	16:12
81		9.7	41	1:59		16:21
80	250	9.5	40	2:00	10	16:30
79		9.4	39	2:01		16:39
78	240	9.2	38	2:02	9	16:48
77		9.1	37	2:03		16:57
76	230	8.9	36	2:04	8	17:06
75		8.8	35	2:05		17:15
74	220	8.6	34	2:06	7	17:24
73		8.5	33	2:07		17:33
72	210	8.3	32	2:08	6	17:42
71		8.2	31	2:09		17:51
70	200	8.0	30	2:10	5	18:00
69		7.8	28	2:14		18:12
68	190	7.5	26	2:18	4	18:24
67		7.1	24	2:22		18:36
66		6.8	22	2:26		18:48
65	180	6.5	20	2:30	3	19:00
64	170	6.2	18	2:35		19:24
63	160	5.8	16	2:40		19:48
62	150	5.4	14	2:45	2	20:12
61		4.9	12	2:50		20:36
60	140	4.5	10	3:00	1	21:00

Scoring For IOC (Field Test) – Modified as data develops during IOC Phase

- **Minimum score for Soldiers in heavy physical demand unit/MOS**
- **Minimum score for Soldiers in significant physical demand unit/MOS**
- **Minimum Score for Soldiers in moderate physical demand unit/MOS (Army minimum)**

Critical Requirements for Deployment to Combat

….fight, decrease risk to self and render aid to others in a combat environment.

Can Do

Fully Fit For Combat

11 Physically Demanding WTBD / CSTs identified in the BSPRRS study

- React to man-to-man contact
- Move as a member of a team
- React to indirect fire dismounted
- Move under direct fire
- Move over, around, through obstacles
- Perform movement techniques (Urban)
- Navigate from point to point
- Transport a casualty
- Conduct a tactical foot march
- Prepare a fighting position
- Drag a casualty to safety

Must Do

Deployable with Risk

Critical Requirements to mitigate risk in a high threat environment

- React to indirect fire dismounted
- Move under direct fire
- Drag a casualty to safety
- Prepare a fighting position

Assesses four (4) primary and three (3) secondary components of fitness

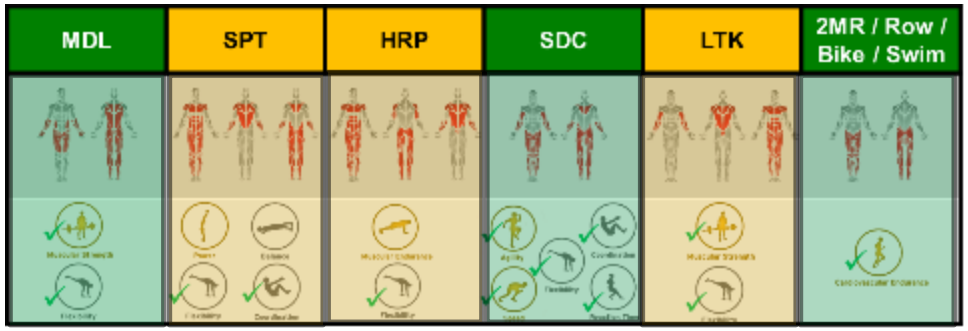
Should Do

- React to man-to-man contact
- Move as a member of a team
- Navigate from point to point
- Move over, through, or around, obstacles
- Conduct a tactical foot march
- Transport a casualty
- Perform movement techniques (Urban)

Requirements not measured by the ACFT Alternate Assessment

Only for Deployable Soldiers on a Permanent Profile

Modified Assessment – Three (3) Event Minimum



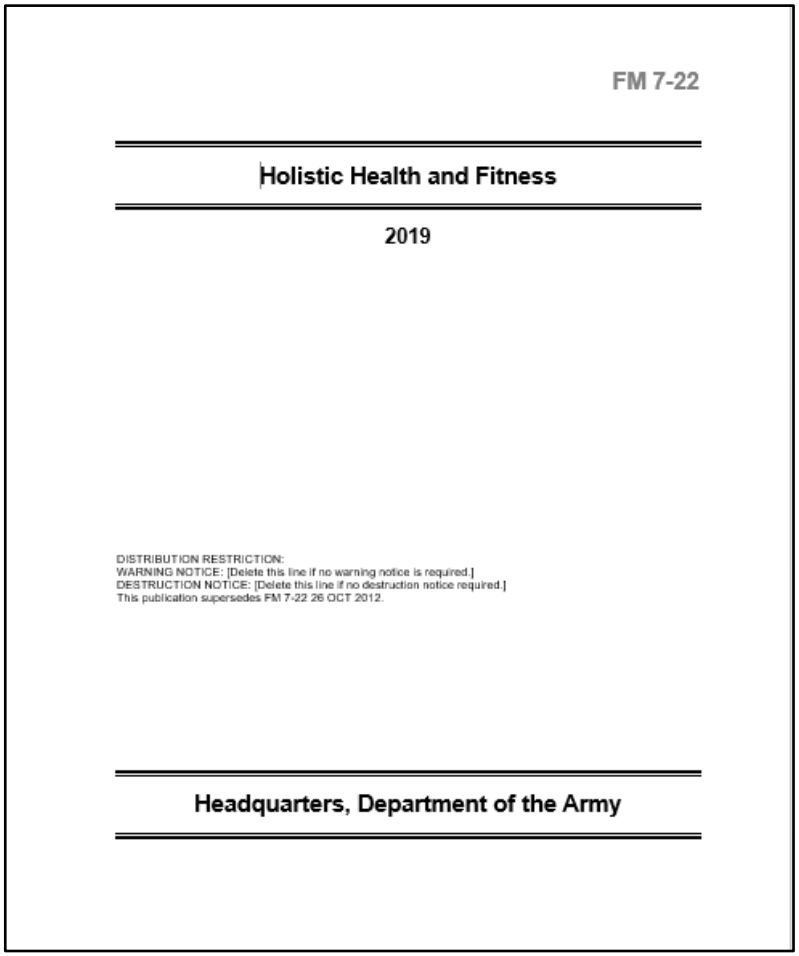
- Soldier MUST complete Deadlift and Sprint- Drag-Carry, ***plus*** one aerobic event (3 non- impact alternative events are authorized)
- Soldier will complete any ACFT event not prohibited by their profile
- Note: Measures the minimum physical attributes to fight, decrease risk to self and render aid to others…

- Only for Soldiers on Permanent Profile with a deployment limiting code
- (Continuation on Active Duty (COAD), Continuation of Active Reserve (COAR), or approved retention waivers)
- Health Assessment – One (1) Event

- Soldier performs ACFT 2-mile run or one (1) of the three (3) authorized aerobic test events; measure time to complete the specified distance.

Pass	Row	Bike	Swim	Run
Distance*	5,000m	15,000m	1,000m	ACFT

*IOC scale scores to be refined during the ACFT Field Test



FM 7-22

Holistic Health and Fitness

2019

DISTRIBUTION RESTRICTION:
WARNING NOTICE: [Delete this line if no warning notice is required.]
DESTRUCTION NOTICE: [Delete this line if no destruction notice required.]
This publication supersedes FM 7-22 26 OCT 2012.

Headquarters, Department of the Army

FM 7-22, Holistic Health & Fitness

Part 1: System – H2F overview and planning
Part 2: Design – Physical, Nutrition, Spiritual, Mental and Sleep readiness
Part 3: Build – H2F program design
Part 4: Deliver – H2F schedules
Part 5: Test – OPAT and ACFT

Appendices:

- PRT Drills and Exercises
- H2F Personnel
- H2F Equipment
- H2F Leader Education
- New Army Water Survival Training, Sleep and, Mental readiness
- New Army Nutrition doctrine
- New Army Pregnancy and Post-Partum Physical Training
- New Army Running Skill doctrine
- New Army Spiritual Readiness doctrine
- New Army Health Coaching instruction

Way Ahead

- **Publish H2F Concept Paper**
- **Publish ADP on H2F System**
- **Publish FM 7-22 and other documents as required**

Army Combat Fitness Test
Alternate event for 2-mile run (2MR)

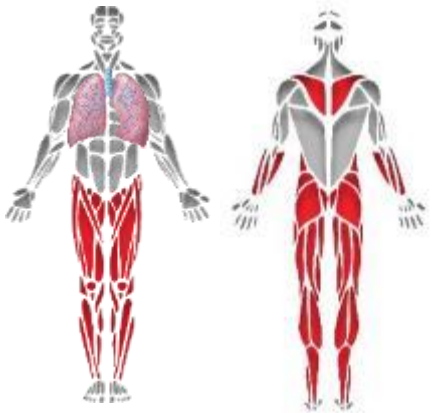
Alternate Event

5,000m Row

- **Task:** Execute a challenging alternate non-impact aerobic event for permanent profile Soldiers who cannot perform the 2-mile run
- **Condition:** Given a standardized and approved horizontal rowing machine (ergometric)
- **Standard:** Execute the rowing event utilizing proper form to meet equivalent ACFT muscular and aerobic performance standards within 25 minutes

- **Relevant Principles for Event Selection**
  1. Efficacy: Highly predictive test assessing for measuring aerobic endurance
  2. Safety: Minimal risk for injury; appropriate for Soldiers on a lower body no / low impact profile
  3. Ease of Administration: Requires one (1) grader event time ≤ 25:00 min per Soldier *
  4. Grading: Simple to grade, replicate over time/space

*= remains TBD with Field Test scoring, age and gender neutral



An ergometric rower works multiple large muscle groups, to include shoulders, arms, core, and legs, at one time. The repetitive push and pull under tension provides a low-impact assessment of muscular and aerobic endurance.

Army Combat Fitness Test
Alternate event for 2-mile run (2MR)

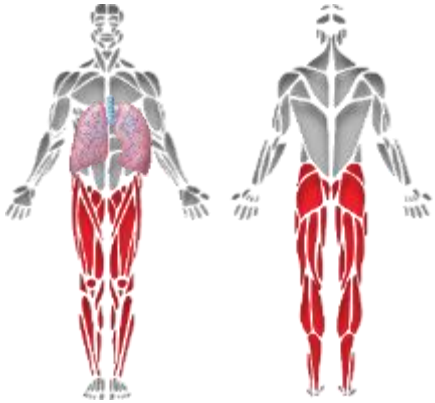
Alternate Event

15,000m Bike

- **Task:** Execute a challenging alternate non-impact aerobic event for permanent profile Soldiers who cannot perform the 2-mile run
- **Condition:** Given a standardized and approved stationary bike machine (ergometric)
- **Standard:** Execute the timed bike event utilizing proper form to meet equivalent ACFT muscular and aerobic performance standards within 25 minutes

- **Relevant Principles for Event Selection**
  1. Efficacy: Highly predictive test assessing for measuring aerobic endurance
  2. Safety: Minimal risk for injury; appropriate for Soldiers on an upper body profile and lower body no / low impact profile
  3. Ease of Administration: Requires one (1) grader event time ≤ 25:00 min per Soldier *
  4. Grading: Simple to grade, replicate over time/space

  *= remains TBD with Field Test scoring, age and gender neutral



An ergometric bike works large muscle groups in the legs. Repetitive movements under tension provides a low-impact assessment of lower-body muscular and aerobic endurance.

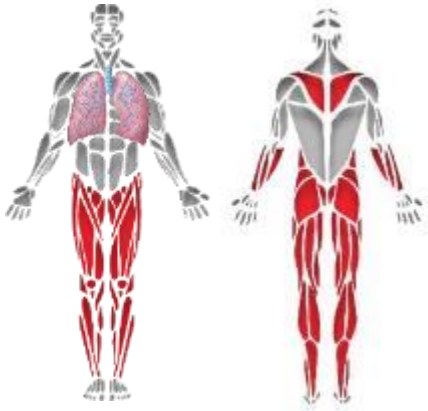
Alternate Event

1,000m Swim

- **Task:** Execute a challenging alternate non-impact aerobic event for permanent profile Soldiers who cannot perform the 2-mile run
- **Condition:** Given a standardized and approved 25-50m swimming pool
- **Standard:** Execute the timed swim event utilizing proper form to meet equivalentACFT muscular and aerobic performance standards within 25 minutes

- **Relevant Principles for Event Selection**
  1. Efficacy: Highly predictive test assessing for measuring aerobic endurance
  2. Safety: Minimal risk for injury; appropriate for Soldiers on an upper body profile and lower body no / low impact profile
  3. Ease of Administration: Requires one (1) grader event time ≤ 25:00 min per Soldier *
  4. Grading: Simple to grade, difficult to replicate over time/space v. pool requirements

*= remains TBD with Field Test scoring, age and gender neutral



The swim works multiple large muscle groups, to include shoulders, arms, core, and legs, at one time. The repetitive pull, kick and recover under

U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – DATA & ANALYSIS CENTER

Driving Intuitive System Design with Usability Metrics: A Case Study

Pam Savage-Knepshield, PhD
Research Psychologist
CCDC Data Analysis Center HSI, C5ISR Field Element, APG, MD

4 March 2020

NDIA Human Systems Conference 2020

APPROVED FOR PUBLIC RELEASE.

OVERVIEW

- System Description
- Why Modernize?
- User-Centered Design Process
- Usability Measures & Targets
- Usability Testing Results
- Usability Metrics Dashboard
- Lessons Learned

Sponsored by PEO C3T, PM Mission Command, PdM Fire Support Command and Control
in close collaboration with the Fires Center of Excellence
ACM Fires Cell-Targeting and the Directorate of Training Development and Doctrine & Leidos

Performed in accordance with AR 602-2
Army Human Systems Integration in the System Acquisition Process

SYSTEM DESCRIPTION

Forward Observer

AFATDS Operator

Fires & Effects

Army & USMC high-level concept of operation

Advanced Field Artillery Tactical Data System (AFATDS)

Primary command and control system for Long-Range Precision Fires Cross-Functional Team initiatives:

- Extended Range (ER) Cannon Artillery
- ER Guided Multiple Launch Rocket System

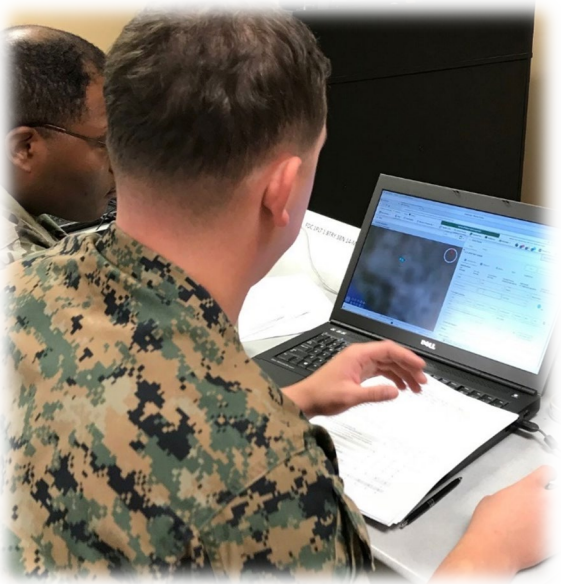
Also primary C2 system for other weapon systems providing automated support for planning, coordinating, controlling and executing fires and effects:

- Mortars and Cannons
- Rockets and Missiles
- Close Air Support and Attack Aviation
- Naval Surface Fire-Support systems

Source: https://peoc3t.army.mil/mc/fsc2.php

WHY MODERNIZE AFATDS?

Legacy AFATDS



Modernized AFATDS

Background

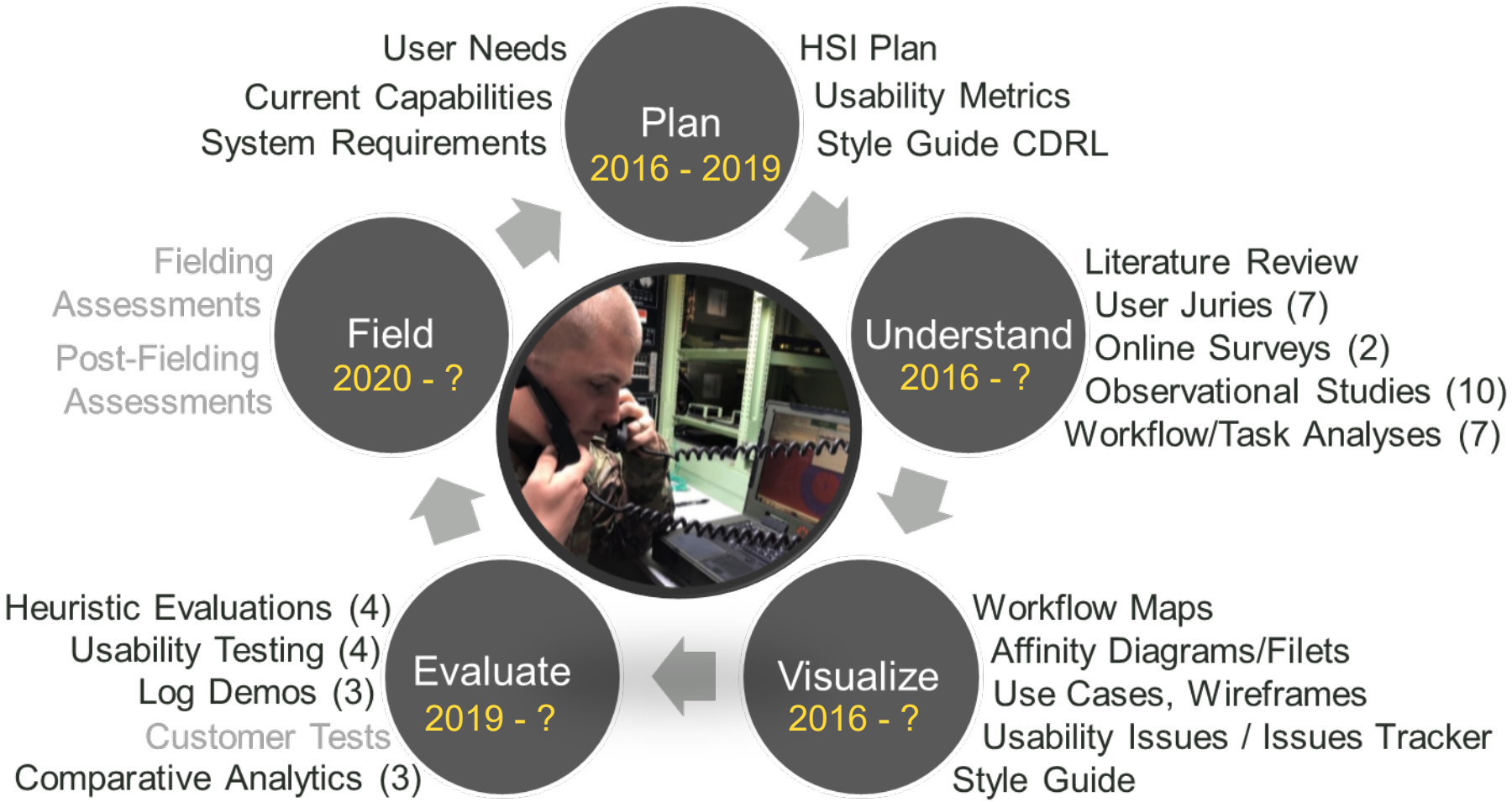
Software is more than 30 years old

- 1981 DARPA sponsored development
- 1984 first contract awarded
- 1996 first fielding

Fast Forward to 2017

- Modernization contract awarded
- Transition to web-based app
- Improve access to training
  - Embedded individual & collective training capability
- Design an intuitive user interface
  - Reduce time to train from 120 to 40 hours
  - Simplify complex cognitive work

USER-CENTERED DESIGN PROCESS

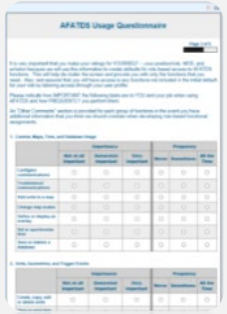


Legend: Begin – End Date

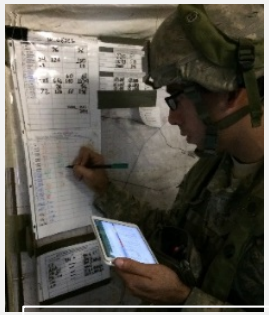
Critical design input received from 994 Warfighters with over 8,589 years of FA experience

WHY UCD?

Focus Groups



Online Surveys

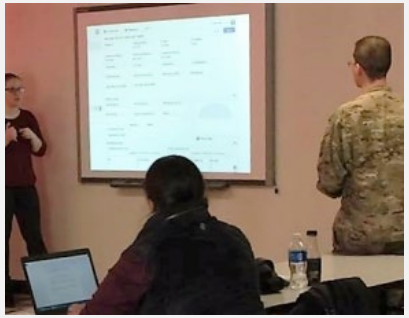


Exercises

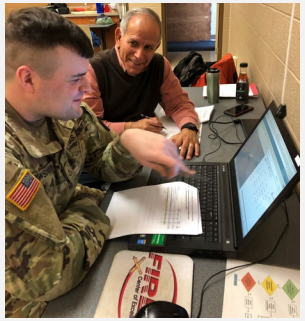
Drill Weekends

Contextual Inquiries

Workflow Capture



Heuristic Evaluation



Usability Testing

To Meet Our Design Goals

- Leverage users' existing knowledge
- Tailor content to subsets of users
- Streamline workflows & align with field artillery doctrine
- Avoid replicating current design issues

Because It Works

- Iterative process involving users throughout design & development
- Design driven by user data and refined by user evaluation
- Iteratively test designs with users until usability targets are met for critical tasks

IRB Approval ARL-15-071, ARL-15-136, ARL-15-132, ARL-17-204, ARL-19-073, ARL-18-133, ARL-19-154

UNDERSTANDING USERS & THEIR NEEDS

UNDERSTANDING USERS & THEIR NEEDS

Objective of the Field Artillery
Destroy, Neutralize, Suppress Enemy with Integrated Fires to Enable Maneuver Commanders to Dominate in Unified Land Operations

twitter.com

The Five Requirements for Accurate Fire

1. Accurate target location and size.
2. Accurate firing unit location.
3. Accurate weapon and ammunition information.
4. Accurate MET information.
5. Accurate computational procedures; requires strict adherence to continuous independent checks.

DESIGN &TEST EMPHASIS

Tasks that span all 3 characteristics are color-coded

Most Critical	Most Frequent	Most Problematic
• Add units to a map	• Process fire messages	• Unhelpful help messages
• Configure and troubleshoot communications	• Configure and troubleshoot communications	• Configure and troubleshoot communications
• Save and restore a database	• Create target lists	• Interoperability
• Edit geometries	• Send messages	• Save and restore a database
• Synchronize time	• Save and restore a database	• Weather data (MET)
• Create target lists	• Create geometries	• Air support requests
• View range fans	• Weather data (MET)	• Delete geometries
• Weather data (MET)	• Perform attack analysis	• Synchronize time
• Distribute status update	• Synchronize time	• View maps
• View ammunition status	• Display an overlay	• Create target lists

Two datasets

- Open-ended on-line questionnaire
- Closed-ended in-person questionnaire with follow-on semi-structured interviews

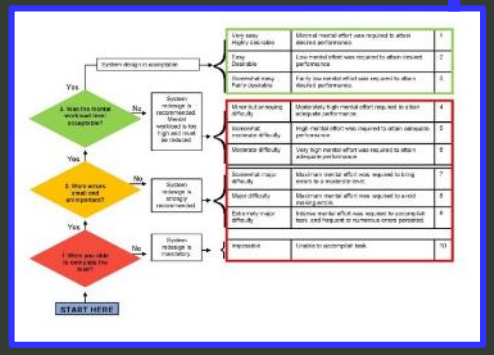
Not actual data; notional data provided for illustrative purposes

USABILITY TARGETS

Ease of Use Ratings

It was easy to...	Strongly Disagree	Disagree	Agree	Strongly Agree	CW Rating
3a. Know how to get started on this task.	1	2	3	4	
3b. Select the Map Mod.	1	2	3	4	
3c. Change the format to UTM.	1	2	3	4	
3d. Save entered data.	1	2	3	4	
3e. Know that entered data was saved.	1	2	3	4	

EoU & CW questions tailored to each task and GUI elements encountered



Modified Cooper-Harper (MCH) Cognitive Workload (CW) Rating Scale

1) Industry Benchmarking

- Mean score of 80 or better on the SUS
- Mean rating of 5.5 or better on the TAM

2) User Satisfaction

85%* of participants judge ease of use (EoU) for each assessed item as "acceptable"

3) Efficiency

85%* of participants judge cognitive workload (CW) for each assessed item as "acceptable"

Acceptable Ratings	Unacceptable Ratings
EoU: "3" and "4"	EoU: "1" and "2"
CW: "1", "2" and "3"	CW: "4" through "10"

3) Effectiveness

85%* of participants *do not require assistance* to complete a task

- Interaction behavior and requests for assistance are documented
- Root causes and mitigations are elicited

*100% for safety-critical tasks

USABILITY TESTING OVERVIEW

Usability testing: one-on-one and buddy tag teaming

Objectives: Identify (1) what is working well, (2) what is not, (3) severity of issues, and (4) user-suggested mitigations

Target Participants

- Range of experience from novice to expert
- Representative mix from echelons and types of units

Method

- Users are timed as they perform “typical” tasks
- Issues encountered and requests for assistance are logged along with user-suggested mitigations
- Users make EoU and CW ratings; “unacceptable” ratings are probed to understand underlying issue & potential mitigation

Results

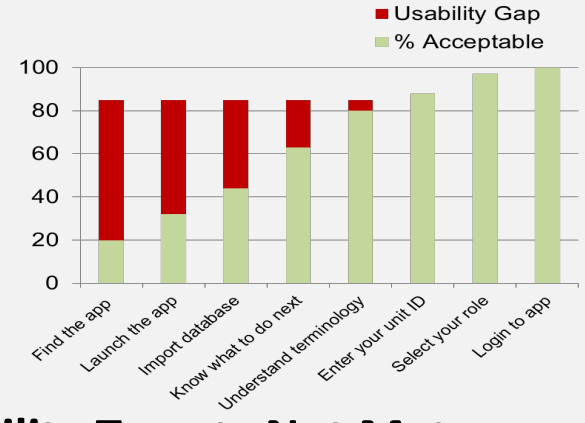
- Usability issues and their severity
- User-suggested mitigations

IRB Approval ARL-18-133, 10 August 2018; ARL-20-006, January 30 2020

USABILITY TESTING
ISSUE IDENTIFICATION AND TRACKING

How do we ensure designs are intuitive?

❶ Identify issues, their severity, root causes, and Warfighter-suggested mitigations



85% Target

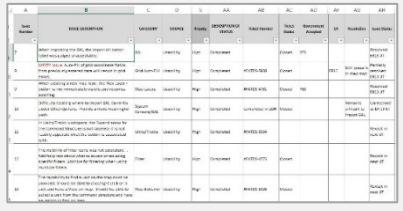
Usability Targets Not Met
- 55% did not require assistance
- 5 steps did not meet EoU or CW targets

Mitigations: Streamline Workflow
- Provide configuration/set-up wizards
- Enable only viable options
- Persist specific settings after shutdown to simplify and facilitate future logins

Issues
Root Causes
Priority
Mitigations
Status

❷ Log issues in HSI Issues Tracker

❸ User Rep & test facilitators prioritize issues



❹ Collaborate with developer's UCD team, review issues, root causes, potential mitigations

❺ As issues are resolved, they are retested in follow-on usability tests to ensure effective mitigation

❻ Progress is updated in HSI Issues Tracker and Usability Metrics Dashboard

Not actual data; notional data provided for illustrative purposes

WHEN USABILITY TESTING IS NOT ENOUGH

Paper Prototyping Fire Mission Processing Screens

Participatory Design
Paper Prototyping Sessions

- When issues identified in usability testing require thoughtful group discussion to identify solid mitigations
- Subject Matter Experts are unable to provide definitive design guidance
- Design visualization varies by user population and requires tailored information presentation for each
- Risk is high that an early design concept will not meet user needs

Procedure

Participants discuss, markup, and layout screen contents so content supports that task's operational workflow

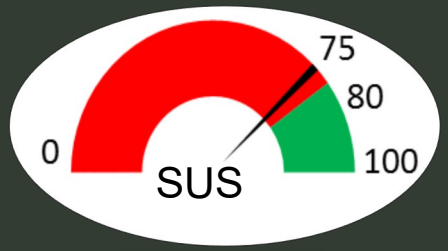
USABILITY METRICS DASHBOARD

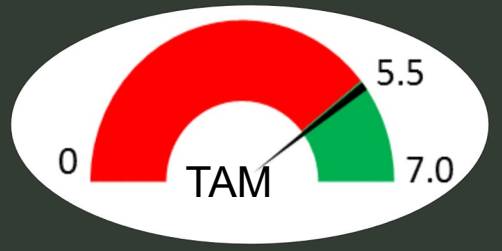
OVERALL: Positive User Experience

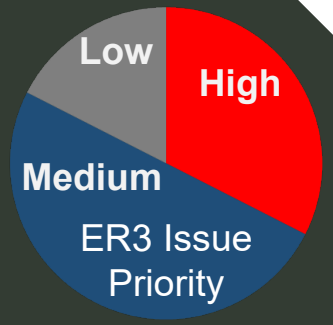
Usability Issue Count

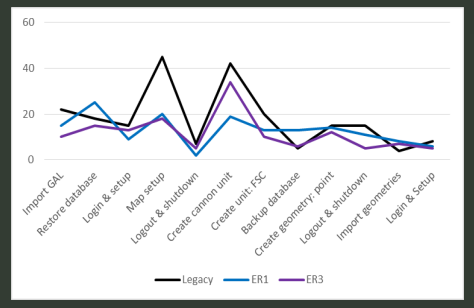
ER1: 80

ER3: 40 (~50%)

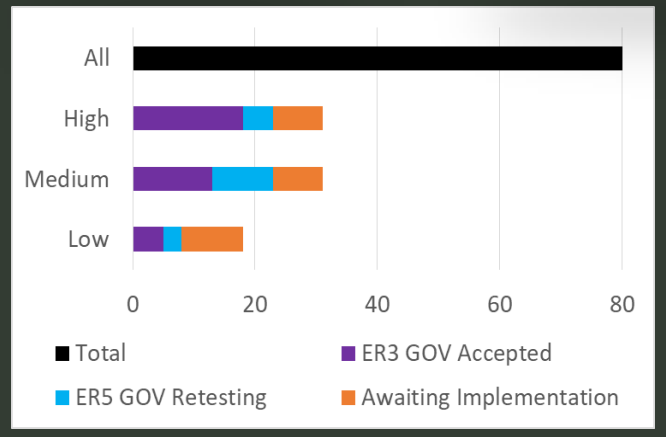




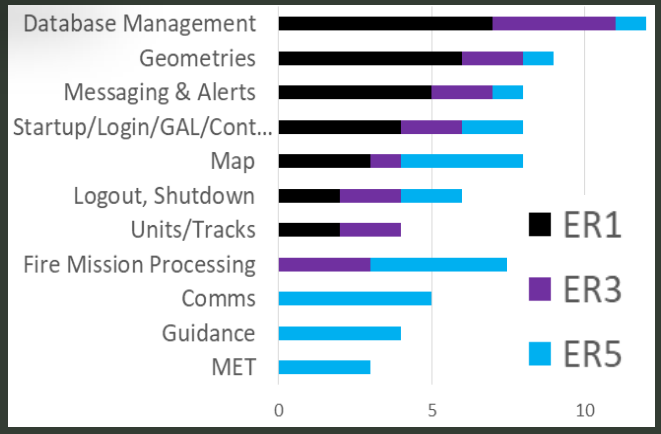




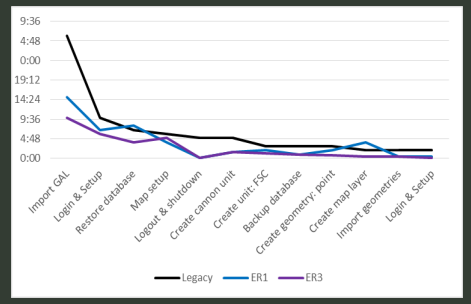
Steps per Task



ER1 Issues (80)
Mitigation by Severity & Status



Test Coverage: Number of
Tasks by Category and ER



Time per Task

25% of ER3 tasks judged intuitive

❶ Restore database ❷ Create unit ❸ Export geometry ❹ Establish Meteorological Data

Not actual data; notional data provided for illustrative purposes

LESSONS LEARNED

Catalysts for Success

- User advocates and UCD champions
- UCD process as a “requirement”
- Design goals identified up-front
- UCD expertise to guide the process and selection of activities to obtain needed design data
- UCD activities identified to obtain the foundational design information
- A multidisciplinary, cross functional team with access to users
- *Early* and *frequent* involvement of *all* in the process
- A vendor-PM agreed upon HSI plan including UCD activities & usability measures and targets
- Stretch targets keeping in mind that the only way to meet them is through iterative design
- A realistic schedule to support Agile development including timelines for usability test results to be included in sprints; they should be part of the development process, not “rework”
- Iterative usability testing conducted until targets are met