

HOLISTIC HEALTH AND FITNESS: ROUPDATE **U.S. ARMY CENTER FOR INITIAL MILITARY TRAINING** 26 APR 2023

Soldiers in H2F Embedded units are 21% more likely* to believe that the "Army **Cares**" about promoting mental, physical, spiritual, sleep, and nutritional wellness.

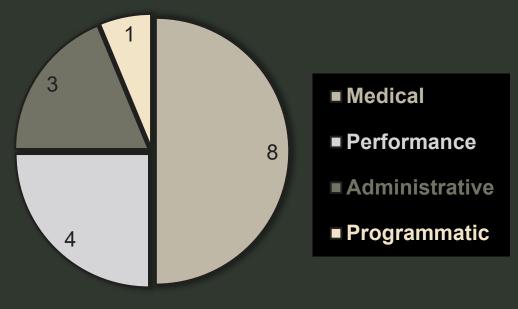
Soldiers who believe "Army Cares" are more than twice as likely* to recommend Army service to others and 15% more likely* to plan on serving until retirement.

*All differences significant at p < 0.001

HOLISTIC HEALTH AND FITNESS SCENE SETTING

DATA COLLECTION

Initial Metrics Previously Approved by ASLs

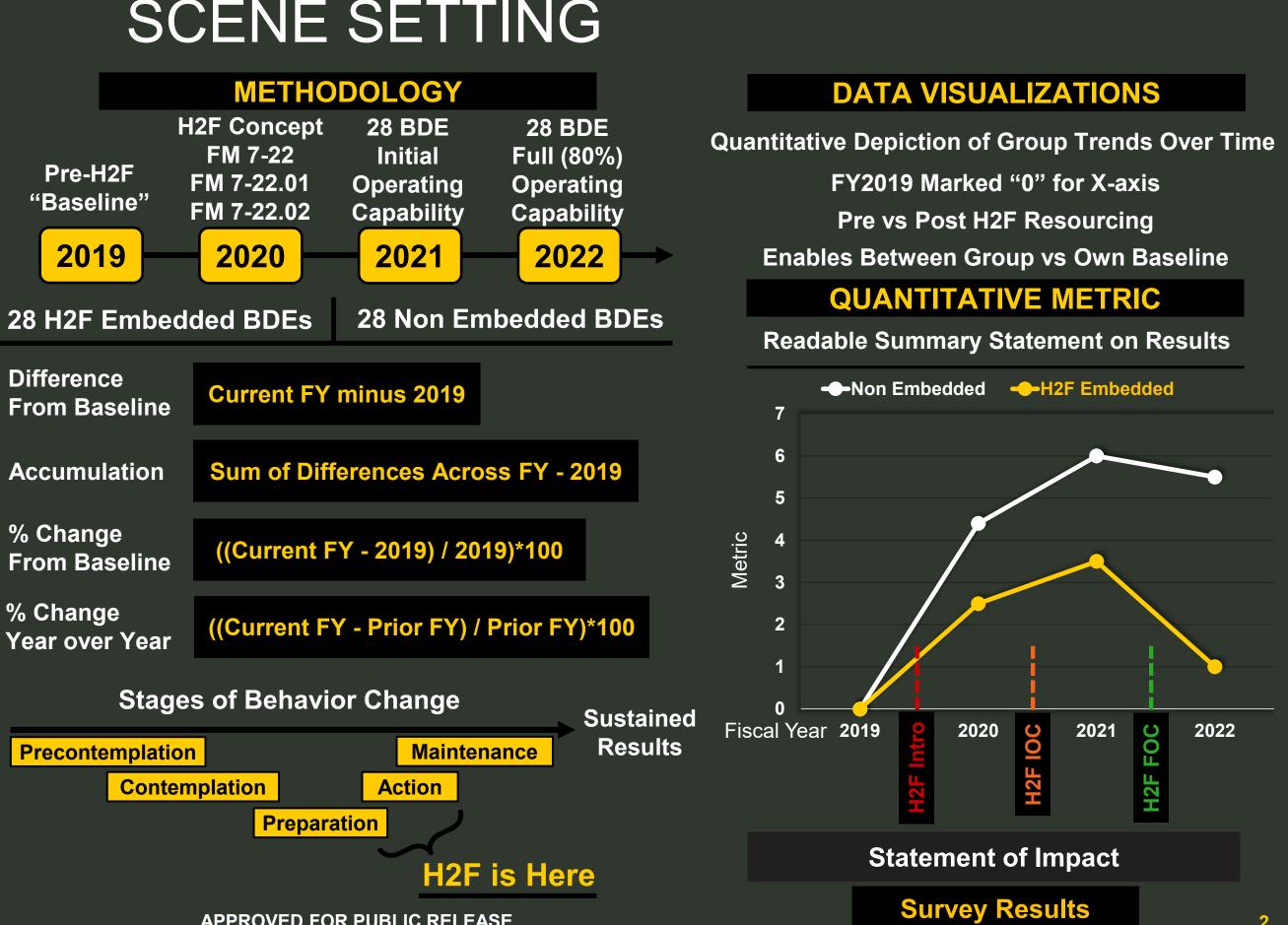


USARIEM Provided FY Data (2019-2022)

Pulled by BDE from Army Systems of Record DTMS | ATRRS | MODS | EProfile MHS | Event Reports

Soldier Readiness Surveys Conducted by CIMT Data Analyzed & Visualized by CIMT





TRADOC CIMT | DR. ANDREW THOMPSON 04.26.2023

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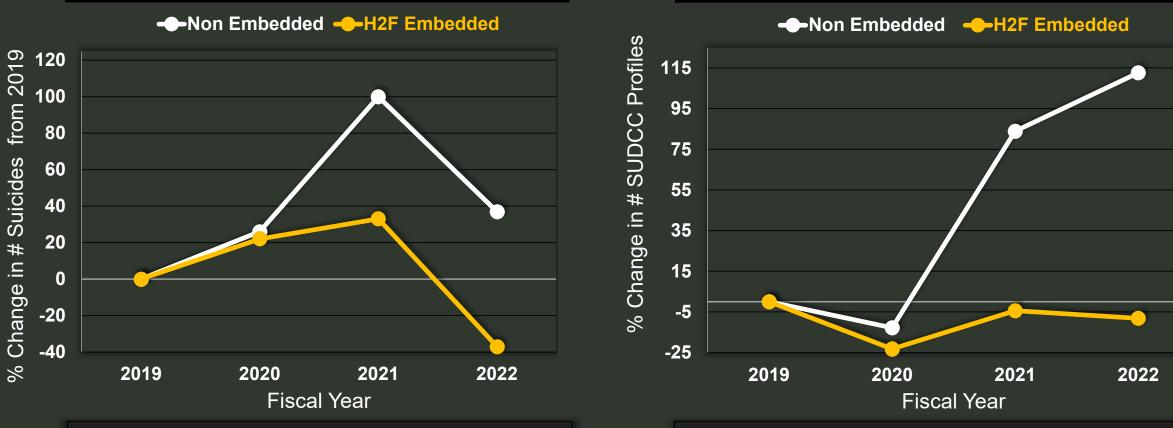
HOLISTIC HEALTH AND FITNESS REDUCING HARMFUL BEHAVIORS

SUICIDES

Compared to 2019, H2F Embedded units have incurred a 36.8% reduction in Service Member suicides (vs. 37% increase in suicides in Non Embedded).

SUBSTANCE ABUSE PROFILES

Since 2019, H2F Embedded units have dramatically inhibited the rise in SUDCC Profiles, down 107% compared to Non Embedded units.

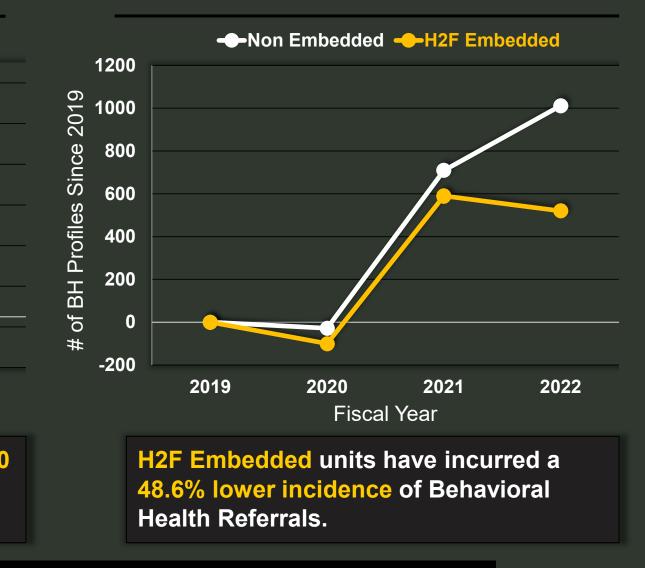


"One loss by suicide is too many. While we're working hard on this problem, we have a lot more to do." - SECDEF Austin H2F Embedded units have accumulated 470 fewer Substance Abuse Profiles over the last 3 years (vs. Non Embedded and 2019).

Soldiers in H2F Embedded units are more likely to:

BEHAVIORAL HEALTH PROFILES

Compared to 2019, H2F Embedded units have accumulated 492 fewer Behavioral Health Profiles over the last 3 years (vs. Non Embedded).



1.) know how to access behavioral/mental health resources.*

2.) believe that their unit encourages and supports mental wellness.*

*All differences significant at p < 0.001

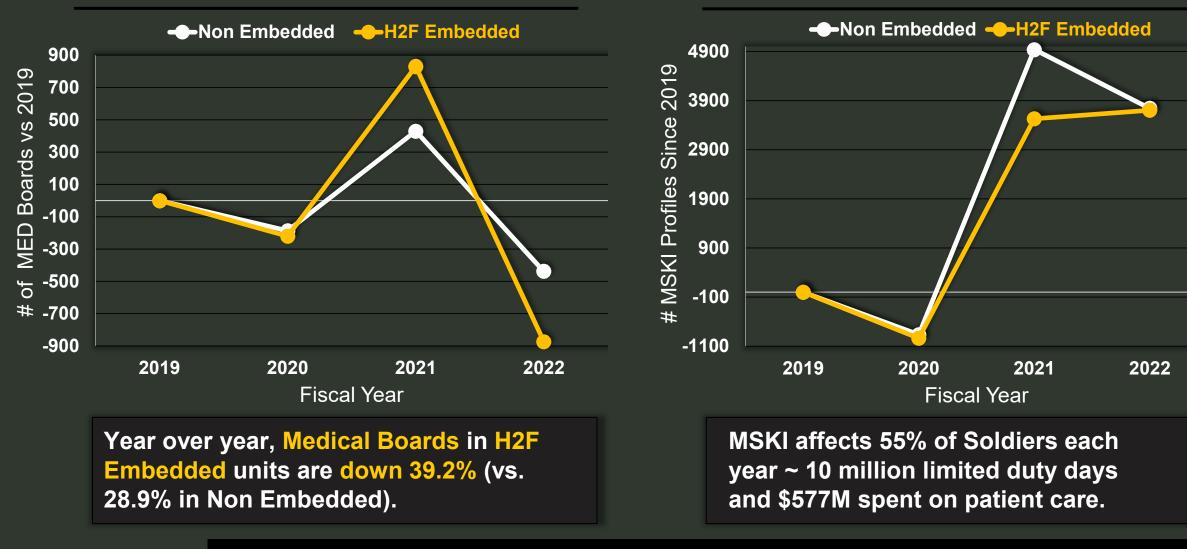
HOLISTIC HEALTH AND FITNESS ENHANCING ACCESS TO PROACTIVE CARE

MEDICAL BOARDS INITIATED

After embedding, H2F units saw an expected bump in Medical Boards due to improved access to care. In 2022, H2F units had nearly twice the decrease from 2019 (vs. Non Embedded).

MUSCULOSKELETAL PROFILES

Trainees & Soldiers experience musculoskeletal injury at high rates. **Embedded H2F resources are starting to** mitigate factors contributing to MSKI profiles.

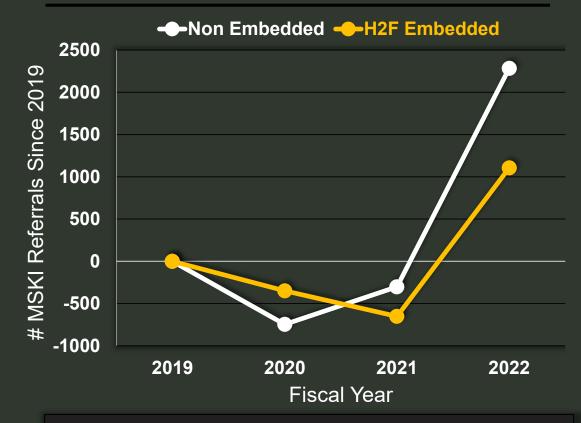


Soldiers in H2F Embedded units who sustain MSKI are:

3.) 88% more likely to see treatment from an Army Dietician. *

MUSCULOSKELETAL REFERRALS

Compared to 2019, H2F Embedded units have accumulated 1,178 fewer external referrals to treat Musculoskeletal Injury over the last 3 years (vs. Non Embedded).



Since Resourcing, H2F Embedded units have accumulated 51.6% fewer external **MKSI Referrals** (vs. Non Embedded).

1.) 50% more likely to seek treatment from an Army PT.* 2.) 63% more likely to seek treatment from an Army OT.*

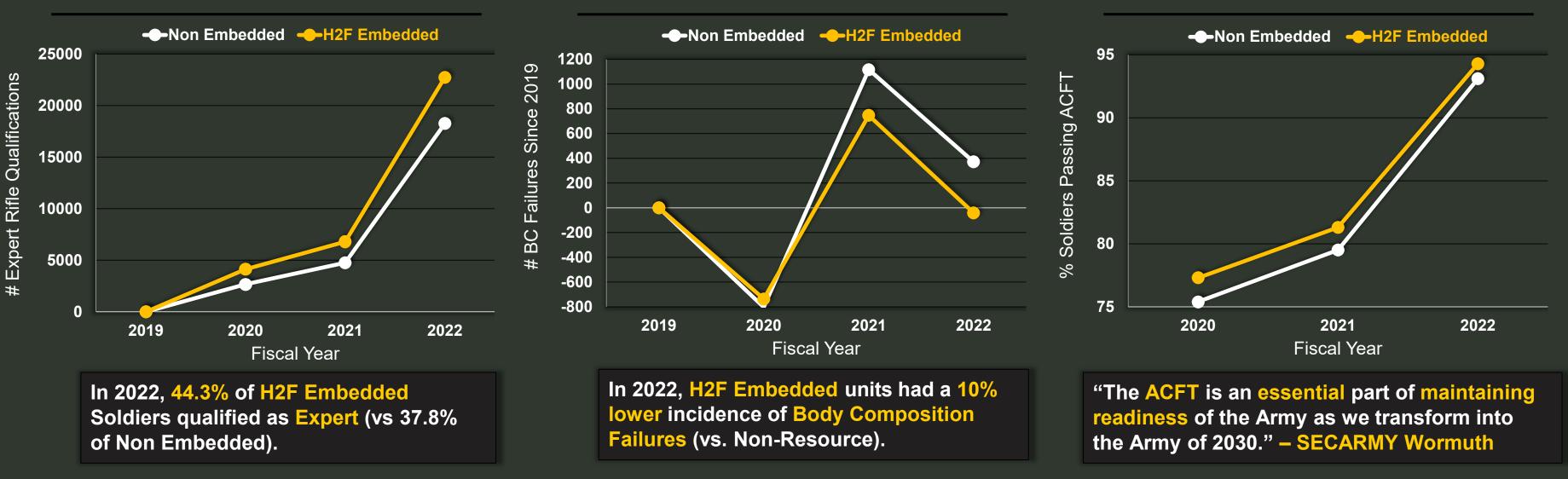
HOLISTIC HEALTH AND FITNESS PUTTING PEOPLE FIRST TO OPTIMIZE READINESS

EXPERT RIFLE QUALIFICATION

Since 2019, H2F Embedded units have 4,479 more Soldiers qualifying as Expert (vs. Non Embedded), enhancing lethality and combat readiness.

BODY COMPOSITION

Compared to 2019, H2F Embedded units have accumulated **418** fewer Army Body **Composition Failures** over the last 3 years (vs. Non Embedded).



Soldiers in H2F Embedded units are more likely to agree that they have the discipline, focus, resilience, motivation, tactical proficiency, and physical ability necessary to operate in a combat/hostile environment.*

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ACFT PERFORMANCE

Since 2019, H2F Embedded units have 5,214 more Soldiers passing the ACFT, which is the equivalent to a full Brigade Combat Team, avoiding a \$400M replacement cost.

*All differences significant at p < 0.001

HOLISTIC HEALTH AND FITNESS

RECAP & WAY FORWARD

H2F ROI

Scene Setting

Data Trends Harmful Behaviors Access To Care **People & Readiness**

Quantitative + Qualitative

The H2F Report **Statistical Inferences DOTmLPF-P** Timeline **Force Modernization**

H2F DATA **ECOSYSTEM**



Front End H2FMS H2F HPTs **Trainees | Soldiers** Cadre | CMD

Data Management cAMRY Environment **Research Layer** AI/ML Ops







2023



CHANGING THE CULTURE OF ARMY FITNESS

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U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND SOLDIER CENTER

MEASURING AND ADVANCING SOLDIER TACTICAL READINESS AND **EFFECTIVENESS (MASTR-E)**

GEORGE MATOOK, MASTR-E PM





26 APR 2023



QUICK FACTS

- MASTR-E is a 5-year Army science and technology (S&T) program, funded by the Army and OSD Close Combat Lethality Task Force
 - Largest ever DoD human performance S&T program (\$100M)
- MASTR-E will provide the initial capability to measure, predict, and enhance Soldier and squad close combat performance
 - Quantified measures of performance
 - Small unit performance forecasting
 - Baselining and assessment methodologies
 - Mostly COTS hardware and software to enable the above
- MASTR-E is transitioning to numerous partners across the Army, SOCOM, and Joint enterprise

Initial capability to quantify Soldier/small unit status, enabling informed Commander and Trainer decisions

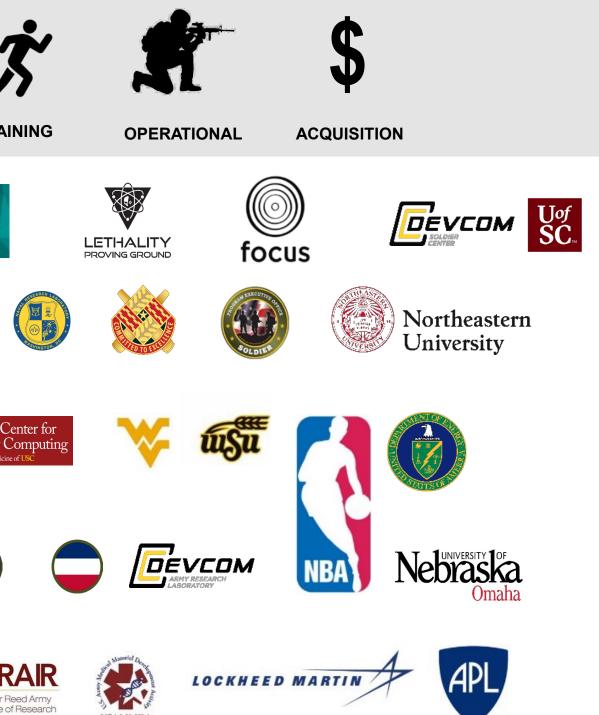


PARTNERSHIPS

Measure, Predict, and Enhance Close Combat Performance ၀၀ ಕ್ಷಂ **OVERSIGHT &** DoD Science and ACADEMIA INDUSTRY TRAINING **OPERATIONAL** Technology **DECISION MAKERS** PROGRAMS AFC PLICATIONS Booz TEAMWORKS Battelle UC SANTA BARBARA DRAPER \mathbf{Y} Allen ABORATOR LETHALITY PROVING GROUND sherpa LINCOLN LABORATORY TAS AIRBORNE UNIVERSITY OF CANTERBURY tusu C Center for 3 WPI **Tufts B** Body Computing le Whare Wiinanga o Weitaha тне Direction of Direc оетсом UNIVERSITY OF UTAH Peraton WRAIR NEVADA NATIONAL NNSS SECURITY SITE DARPA Walter Reed Arm **USARIEM** Institute of Research USAMMDA Soldier Health • World Health

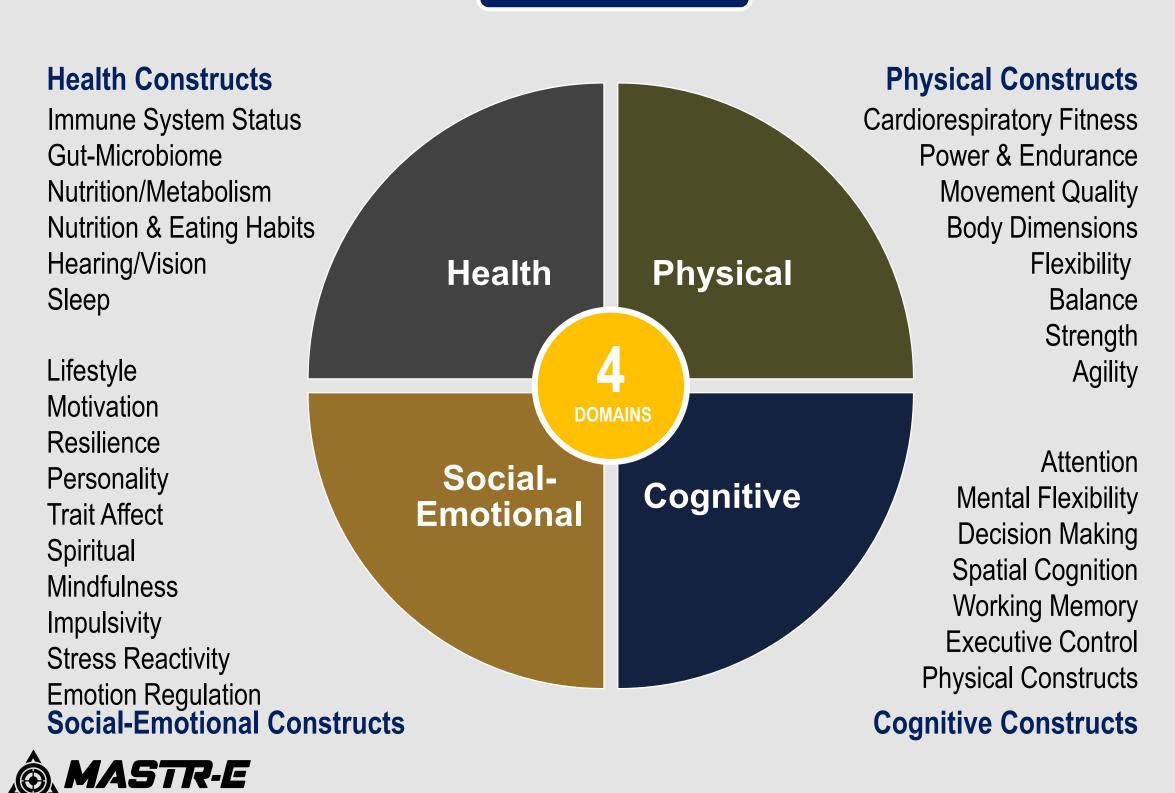






PREDICTORS AND OUTCOMES

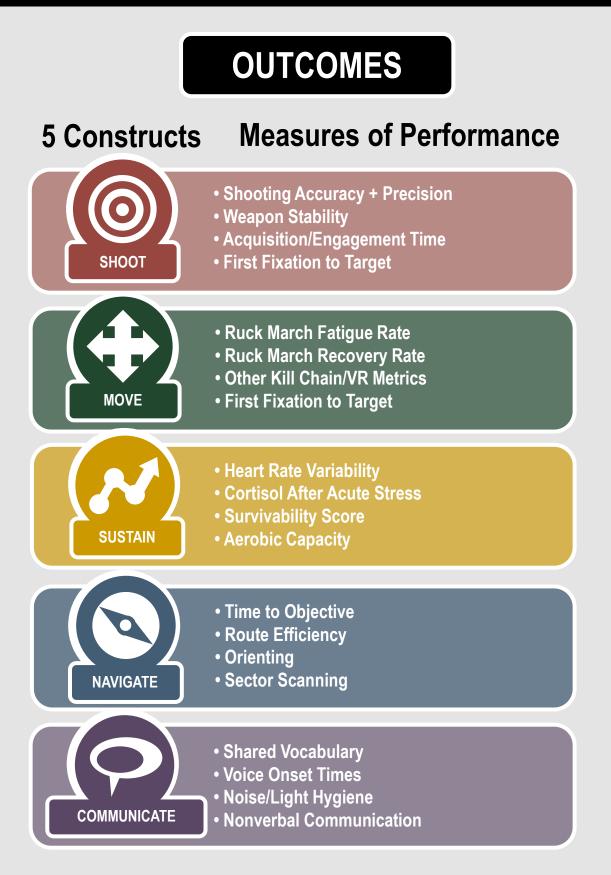
PREDICTORS



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P-51 Instrument Panel

80 year-old technology, still more timely and objective information than we currently have on the human weapon system

Soldier/Unit Performance Dashboard

State assessment plus predictive performance



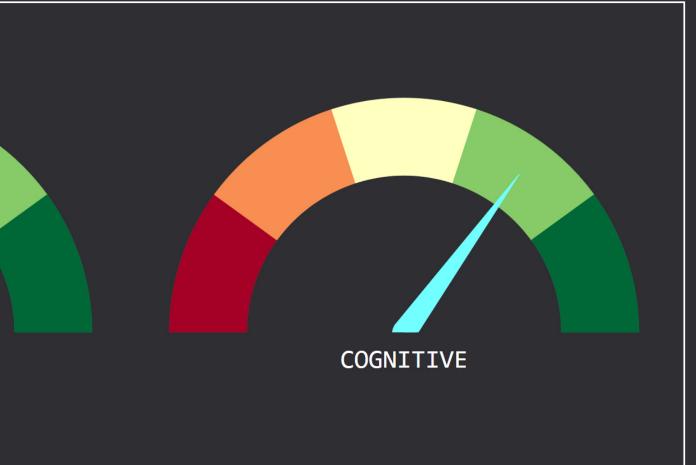


RAMP-UP READINESS ASSESSMENT AND MODEL PREDICTIONS FOR UNIT PERFORMANCE

		-	
STATUS		READINESS	
STRESS			
Units:			
Range: [39.33, 37.07]	past 1-3 hours		
Heart Rate Variability	~		
SLEEP			
Units: hours Range: [7.00, 7.00]	past 24 hours		
Sleep Duration			
PHYSICAL EXERTION			
Units: rating	over selected minute		PHYSICAL
Range: [4.00, 4.00]	range		PHISICAL
	• 2-10 ● 11-30 ● 31+		
Borg10	-		
	•		
HYDRATION			
Units: quarts			
Range: [0.53, 0.63]	past 24 hours	TACTICAL OUTCO	'IE S
Water Consumption	· .		
•	,		
THERMAL LOAD			
Units: wet bulb globe temperature (wbgt)	thermal mange even last		
Range: [73.97, 74.53]	thermal range over last 1-3 hours		
	O Hot ● Cold	SITUATIONAL AWARENESS	DECISION MAKING
Thermal Hot	-		
		Model Outputs	
		Piodel Odcputs	
CALORIE INTAKE			
Units: calories			
Range: [1543.17, 1641.89]	past 24 hours		
Calorie Intake	-		
•			
Wet Bulb Calculator			





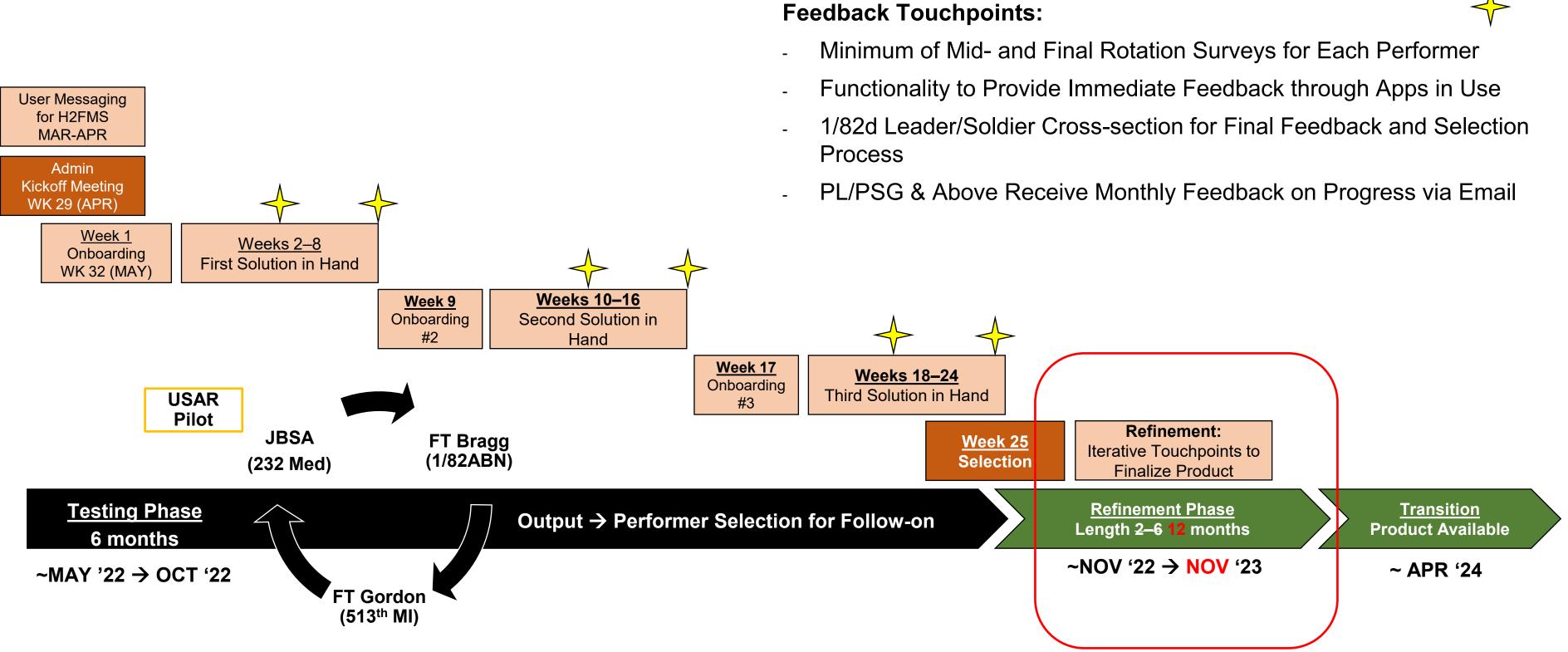




PLANNING & PROBLEM SOLVING



H2FMS Pilot Framework



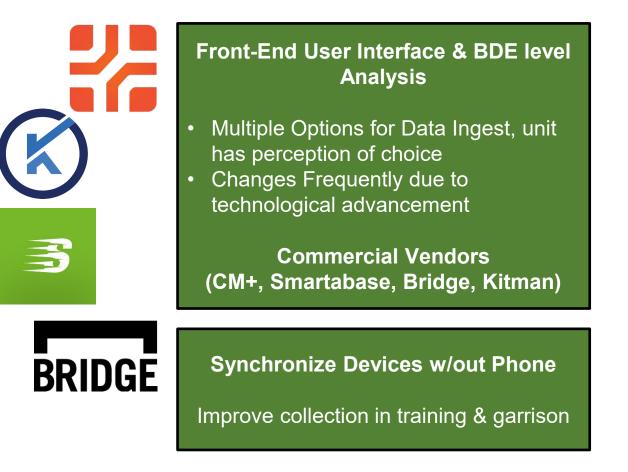
Refinement Phase

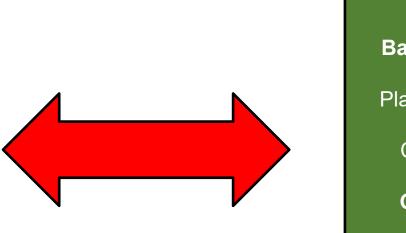
Immediate Action – Phase II Enhancement

- 12-month period of performance starts o/a Nov '22
- Unit Picks on desired platform = $CM + \rightarrow 1/82ABN$, 513MI, USAR
- Unit gets access while developing backend data warehouse and feature updates

Long Term:

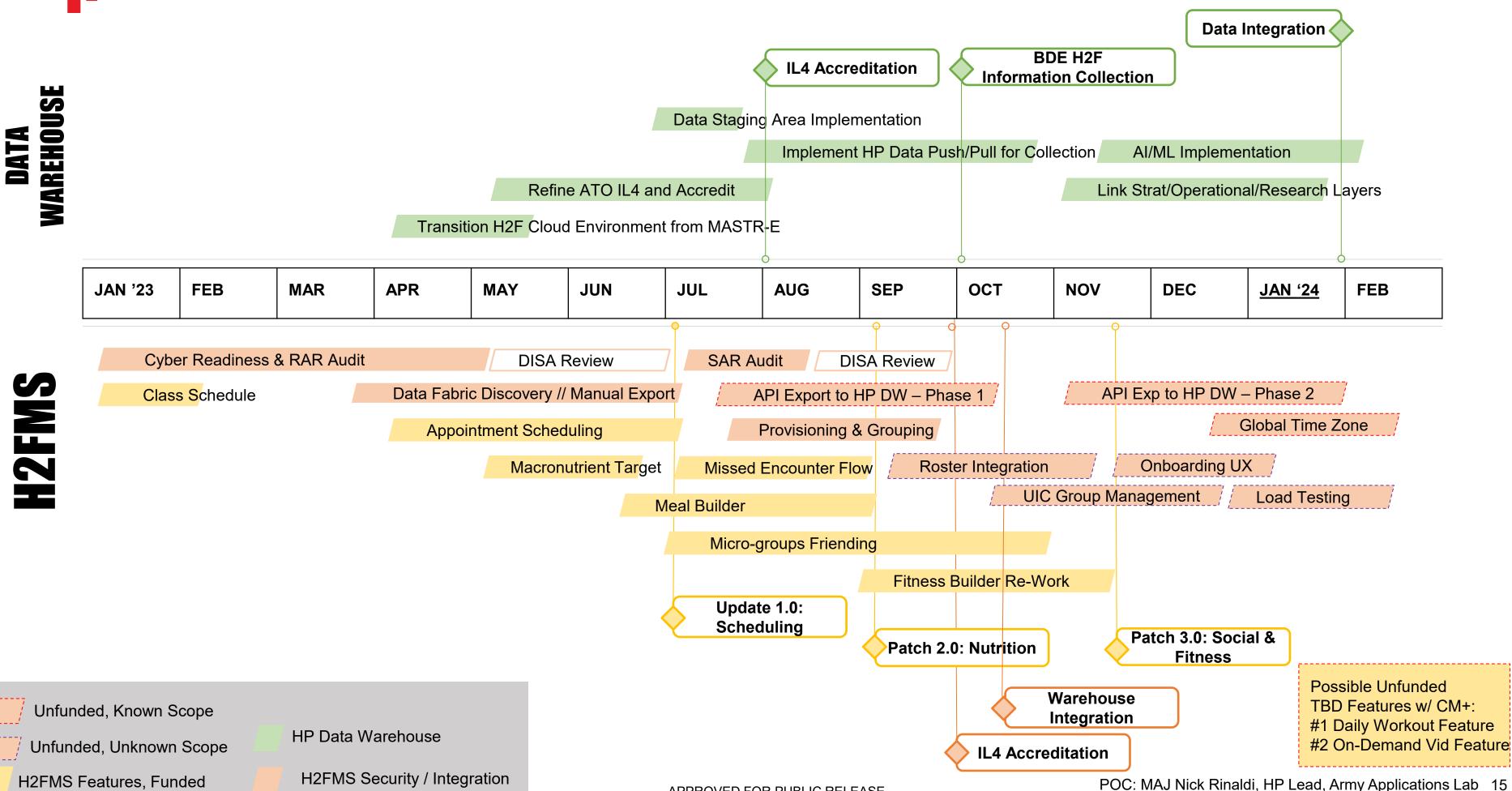
- Catalog "Rules to Play" for AMS type applications multiple applications can play, as long as they align with requirements
- Plug and play into HP Data Warehouse Owned by H2F
- MASTRE provides research developed algorithms over time to help inform
- 18ABC provides developed algorithms over time, largely lethality related





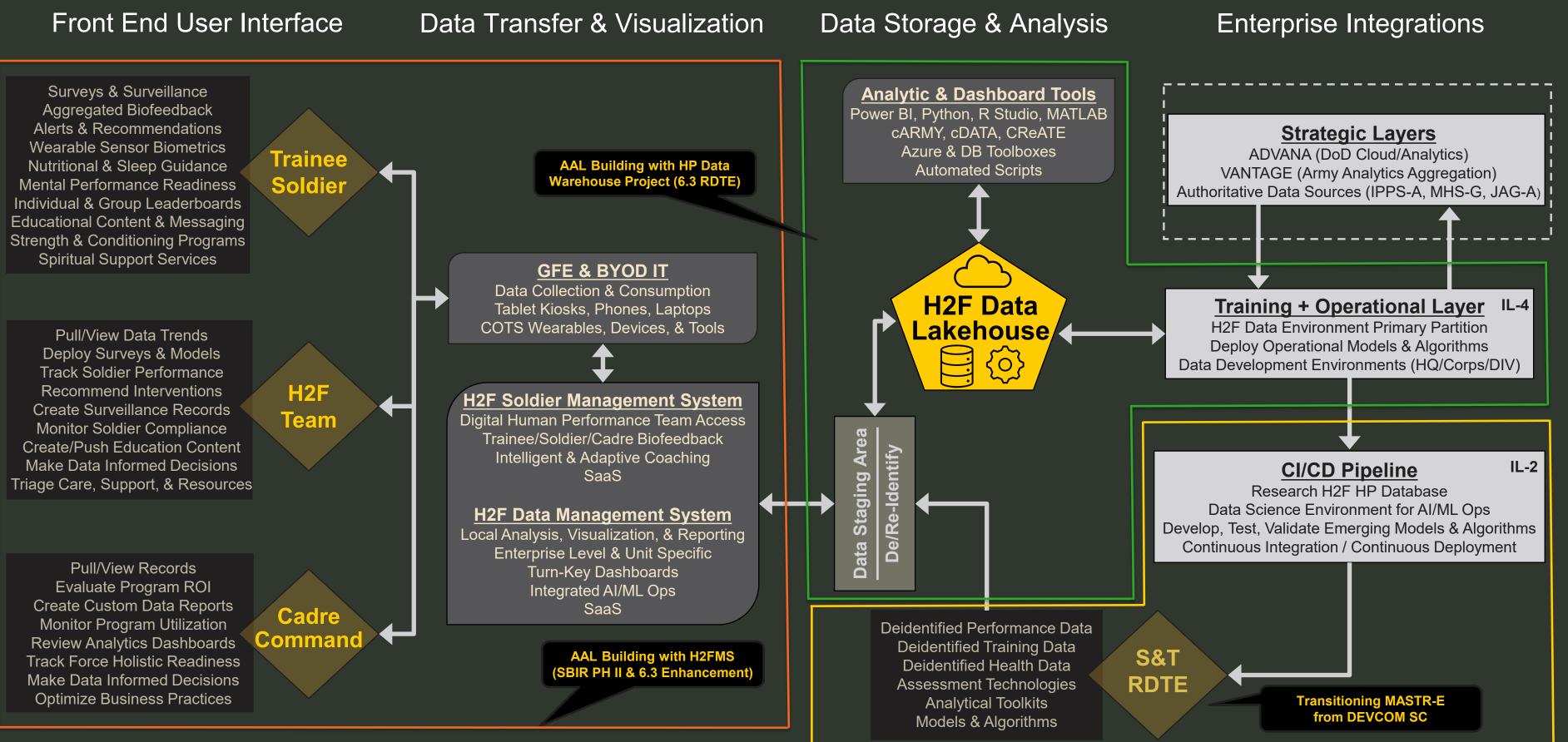






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H2F SOLDIER PERFORMANCE DATA ECOSYSTEM



HOLISTIC HEALTH AND FITNESS

RECAP & WAY FORWARD

H2F ROI

Scene Setting

Data Trends Harmful Behaviors Access To Care **People & Readiness**

Quantitative + Qualitative

The H2F Report **Statistical Inferences DOTmLPF-P** Timeline **Force Modernization**

H2F DATA ECOSYSTEM

History MASTR-E + AAL SBIRs

Front End H2FMS H2F HPTs **Trainees | Soldiers** Cadre | CMD

Data Management cAMRY Environment **Research Layer** AI/ML Ops

MODERNIZATION TARGETS

CJCSI TFF \rightarrow CBA **S&T RDTE Informed by Field**

H2F Domains Capability Goals Knowledge Goals

H2F Data ATTP H2F CBA ICD, CDD, & DCR

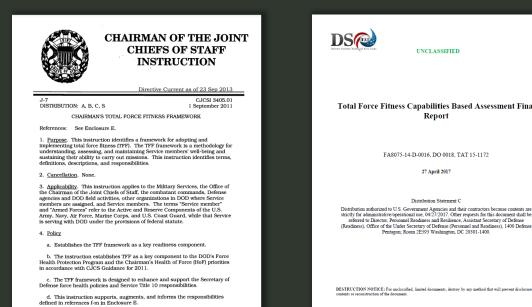


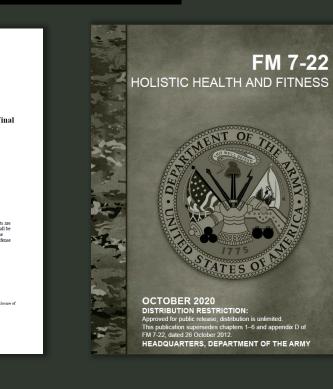
HOLISTIC HEALTH AND FITNESS SHORT RANGE TARGETS: SCENE SETTING

DEMAND SIGNAL

Report

FA8075-14-D-0016 DO 0018 TAT 15-1172 27 April 2011







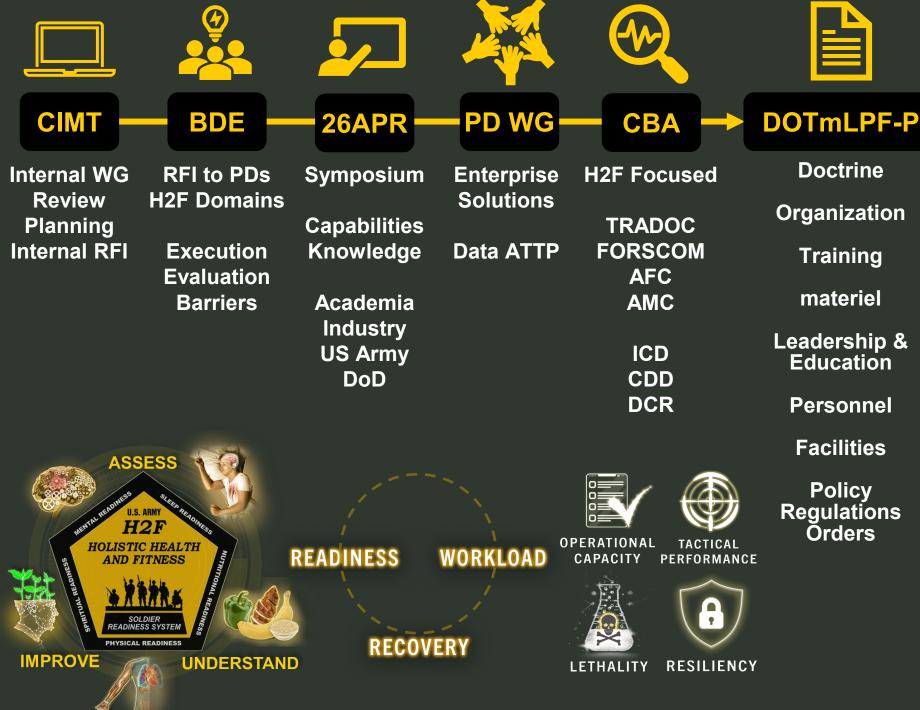
CIMT

Review Planning

Mission Readiness & Effectiveness:

UNCLASSIFIED

DOMAIN METRICS ? CAPABILITY REQUIREMENTS ? BASELINES? **PROGRAM EVALUATION ? EXISTING CAPABILITIES ? PROGRAM RESOURCES ? RESULTING GAPS ? BARRIERS**?



04.26.2023 TRADOC CIMT | DR. ANDREW THOMPSON

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PROCESS

HOLISTIC HEALTH AND FITNESS SHORT RANGE TARGETS: COMMON ACROSS ALL DOMAINS **KNOWLEDGE**

CAPABILITIES

H2F HPT/User Software

- Encompass ALL H2F Domains
- •Develop & Push H2F Programming & Education
- Capture & Track Key Metrics
- Data Management System
- Track Utilization & Outcomes
- Realtime Readiness & ROI
- Simplified Data Analysis
- Actionable Dashboards
- Automated Reports
- AI/ML Ops

- $\mathbf{0}$

H2F Data Doctrine

Concept & Strategy

Tactics, Techniques, & Procedures

- Surveillance

– Surveys

- Biometrics

Scheduled & Event Driven

– In Processing & Out Processing

- Monitoring (Daily/Weekly/Monthly)

- Pre/Intra/Post Events & Interventions

Traditional & Interactive Digital Format



HOLISTIC HEALTH AND FITNESS PHYSICAL DOMAIN: SHORT RANGE TARGETS KNOWLEDGE

CAPABILITIES

02

Automated ACFT

- Reduced Personnel Load
- Digitized Collection
- Integration of COTS Tech
 - Timing/Counting Devices
 - Tablets
 - Wearables
- After Action Intel
- Cloud Upload

03

Movement Competency Screening Protocols

- High Throughput
- Digitized
- Validated
- Actionable

04

Access to MSKI Profile Data

- Triage Dashboards
- Temporary Profile Flags
- MedBridge Access for ALL Injury Control Team

02

Benchmark PT

- Periodic Assessment Protocols
- Performance
- Movement Competency
- MSKI Risk Screening
- Validated Against CST & **KPIs**



03

Fitness vs Soldiering Benchmarks

- Tasks, Conditions, & Standards
- Fitness Construct
- Power, Strength, Endurance, Anaerobic, Aerobic, Mobility
- GS Validated Options
- Applied Skill
- Soldiering + MOS Tasks
- In Context

04

Off-Cycle PT

- H2F Domain Outcomes
- Effects on Development
- Effects on Sustainment
- Effects on Resourcing





HOLISTIC HEALTH AND FITNESS SPIRITUAL DOMAIN: SHORT RANGE TARGETS **KNOWLEDGE**

CAPABILITIES

02

Tools to Measure

- Spiritual Readiness vs Religion
- Individual vs Group
- Objective & Subjective

03

Tools to Enhance

- Hands-on & Hands-off
- If, Then Business Rules for **Optimization Strategies**
- Individual & Collective
- Religions & Non-Religious

04

Motivational Interviewing

- For Providers
- For Trainees/Soldiers
- For Cadre/Command

02

Quantifying Spiritual

- Quantitative & Qualitative
- Models Across ALL Possible Spiritual Expression
- Enforce Use of Spiritual **Readiness Tool from DA** UMT



03

Spaces & Equipment Sets

- How to
- Build
- Develop
- Promote Utilization
- Track ROI

04

Educational Materials

- Standardized
- Enterprise Solution
- Integration with ALL Domains





HOLISTIC HEALTH AND FITNESS NUTRITIONAL DOMAIN: SHORT RANGE TARGETS **KNOWLEDGE**

CAPABILITIES

02

Tools to Measure & **Build Plans**

- Plate Analysis
- Food Logging
- Individual Current State vs Goal Programming
- Scheduling System
- Reporting System

03

Nutrient Fueling Stations

- Grab & Go
- Pre/Post PT
- 24/7 Access
- Utilization Tracking

04

DFAC Modernization

- Warrior Restaurants
- Individual Warrior Plate Models & Examples
- Nutrient Timing w/ POI Demands
- ID Cards for Food Impacts on Performance. Recovery, Health, Fitness

02

Fueling Connections

- To Performance
- To MSKI
- Risk Screening
- Cost vs. Benefit Analysis



03

Nutritional Plans

- Based on Body Comp, ACFT, & POI Timing
- Specific to Location
- DFAC
- Field
 - Home
 - Pre/Post Event

04

Educational Library

- Handouts
- Presentations
- Digital Activities
- Posters





HOLISTIC HEALTH AND FITNESS SLEEP DOMAIN: SHORT RANGE TARGETS

CAPABILITIES

02

Tools to Measure

- COTS Wearables
- Neurocognitive Performance Tasks
- Smart Mattresses
- Off-Body Movement

03

Tools to Enhance

- Sleep – Onset
- Quality
- Continuity
- Short-term Readiness When Sleep Deprived
- Reduction in Burnout

04

POI Flexibility

- Training Plans Informed by Readiness, Workload, Recovery (Sleep) Monitoring
- Group & Individual Based Glidepaths

02

Facility Modifications

- Barracks Hygiene
- Lighting
- Temperature
- Acoustics
- Cost vs. Benefit Analysis



KNOWLEDGE

03

- Operationalization
- In the Field & Garrison
- Evidence Based Interventions
- Work/Rest Cycle Optimization
- Go, No-Go Thresholds for Readiness
- If. Then Business Rules & **Optimization Strategies**



04

Technical & Tactical Skills

- Sleep Status Influence on
- Skill
- Acquisition
- Retention
- Transfer
- Physical Performance Readiness
- MSKI Risk
- Behavioral Health
- POI Modification Strategies
- Cost vs. Benefit Analysis



HOLISTIC HEALTH AND FITNESS MENTAL DOMAIN: SHORT RANGE TARGETS **KNOWLEDGE**

CAPABILITIES

02

Tools to Measure

- Cognitive Performance
- Validated & Reliable
- Construct Validity
- Contextually Relevant
- Objective & Subjective
- Transfer to MOS Tasks
- Group Cohesion
- MOS Task Transfer

03

Tools to Enhance

- One to Many Contact
- Readiness
- Recovery
- Cohesion

04

Interactive Education

- Basic \rightarrow Applied
- Simple \rightarrow Advanced
- Progressions/Regressions
- Specific to H2F
- Cadre / Trainee / Soldier
- BCT, Pre/Intra/Post Deploy
- Performance vs Behavioral
- Common Soldier Tasks
- MOS Tasks



02

Cognitive Performance Mindset Optimization Screening **Strategies**

- Validated & Reliable **Assessment Protocols**
- Tasks
- Surveys
- Biometrics
- Construct Validity & **Contextually Relevant**
- Baseline
- Return to Duty
- NonClinical Go / NoGo

03

- Flagging Schema
- Evidence Based Interventions
- No Tech
- Low Tech
- If. Then Business Rules for Primary through Tertiary Protocols

04

Integration Methods

- With Universities for **Education & Personnel** Acquisition
- Models with Other H2F Domains
- Within POI
- With Other Mental **Readiness Efforts**
- -R2
- Cadre Resiliency Program
- Drill Sergeant Training
- CR2C



WEARABLE BIOSENSORS IN ARMY BASIC TRAINING

10.000' View

INPUT

LINE OF EXECUTION

NDAA H.R. 117-397

TASK 1. ASC FEASABILITY REPORT

COTS Wearable Biosensors for New Recruits

- Clean Physiological Baseline Data
- Leadership Awareness of Cognitive Function
- Monitoring Physiological Workload
- Grow and Sustain Healthier, Ready Force
- Connecting Recruits to Promote Accession

TASK 2. CONDUCT ANALYSIS

Requires Data Collection & Rapid Prototyping

- Will the Wearables Decrease Attrition Rates
- How the Data Could Inform H2F System
- Potential to Develop and Sustain Mentally &
- Physically Resilient Soldiers

PLAN

1. OPT Kickoff

- CMD. Cadre. H2F
- Location Logistics
- Market Research
- 3. Develop Approach
- 4. Identify Processes
- 5. Harden Requirements 6. Develop
- 6. Determine Mechanisms
- Devices
- Wearables
- IT Equipment
- Services
- Academic
- Data Management
- Svstem
- Cognitive App Testing
- Pilot Support
- TRADOC
- AFC

1. Procure 1. In-Process ■ H2F HPT Scale Wearables & IT Leverage H2FMS Cadre Services 2. Update

- CMD Team
 - 2. Iterate
 - Dashboards
 - POI Integration
 - H2F AARs
 - 3. In-Process Trainees
 - Baselining
 - Monitoring
 - Event Specific
 - Educational AARs
 - End of POI Re-
 - baselining
 - 4. Out-Process
 - Trainees
 - H2F HPT, Cadre,
- CMD
- 5. Preliminary Data Analysis
- 6. Preliminary Data
- H2F HPT, Cadre, CMD

4. Out-Process

Trainees

Study / H2FMS

POI Integration

Playbook

• H2F AARs

3. In-Process

Trainees @

BCT

Access

Recruitment

- 10+ Weeks Prior to

- Push PT Prep Plans

- Push H2F Education

REC BTN Baselining

- H2FMS License

Dashboards

5. Data Collation

GOV SUPPORT

•TRADOC: CIMT, G6, USAREC, MCoE •AFC: DEVCOM, AAL, MRDC, AI2C •HQDA: G3, G1 IPPS-A, CIO ECMA •General Counsel Acquisition

ORIENT >> PROCESS PERCEIVE -H₂F OBSERVE DECIDE HOLISTIC HEALTH AND FITNESS SHOOT MOVE IMPROVE **UNDERSTAND** COMMUNICATE APPROVED FOR PUBLIC RELEASE

- >PREPARE >DEPLOY >ITERATE >REPORT 1. Publish DA EXORD 2. Gather Requirements 2. Procure Devices &
 - 3. Onboard Support
 - Team

 - Dashboards
 - Study Playbook
 - H2F POI Integration
 - 7. Pressure Test System
 - 8. Refine As Needed
 - 9. Transport
 - 10. Onsite Setup
 - 11. Onsite Hardening
- IT ATO Submission
- IRB Determination

4. IT Authority to Operate 5. IRB Determination Data Workflows

- Analytical Scripts
- Educational Content

- - - - Report

ENDSTATE

INITIAL MILITARY TRAINING

- 1. Data Aggregation
- Surveillance
- POI MOPs & MOEs
- Wearable Biometrics
- 2. Data Analysis
- Quantitative & Qualitative
- Descriptive
- Diagnostic
- Predictive
- Prescriptive
- H2F HPT, Cadre, CMD 3. Data Visualization
 - Composition
 - Distribution
 - Relationship
 - Comparison
 - 4. Data Documentation
 - ASC & ASL Brief + Report
 - DOTmLPF-P
 - Integration
 - Publications

VALIDATED PROTOTYPE

- •ASC & ASL Reports & Briefs
- •COTS Wearable Device Integration
- •H2F Data Ecosystem ATO
- •H2F Dashboards, Analysis, Reporting
- •H2F Modernization Strategy & ATTP

ANALYTICAL INSIGHTS

- Reduction in MSKI & Attrition
- Wearable Device Accuracy
- Cognitive Function Monitoring
- Physiological Workload
- Behavioral Health Indicators

STAKEHOLDERS

- •ASCs & ASLs
- •ASA: M&RA, ALT
- •TRADOC: CIMT, USAREC, MCoE
- •AFC : DEVCOM SC, AAL, SWF
- •DRUs: MEDCOM. USAASC
- •HQDA: G1, CIO ECMA
- •FORSCOM

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CJCSI TFF \rightarrow CBA **S&T RDTE Informed by Field**

H2F Domains **Capability Goals Knowledge Goals**

H2F Data ATTP H2F CBA ICD, CDD, & DCR



INTEGRATING **WEARABLES**

NDAA Language **COTS Wearables MSKI & Attrition**

Inform H2F Domains Quantitative Qualitative

H2F HPTs **Trainees | Soldiers** Cadre | CMD



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