

## 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.

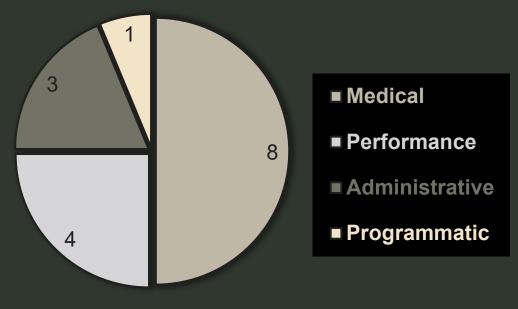
Soldiers who believe "Army Cares" are more than twice as likely\* to recommend Army service to others and 15% more likely\* to plan on serving until retirement.

\*All differences significant at p < 0.001

## **HOLISTIC HEALTH AND FITNESS** SCENE SETTING

#### **DATA COLLECTION**

#### **Initial Metrics Previously Approved by ASLs**

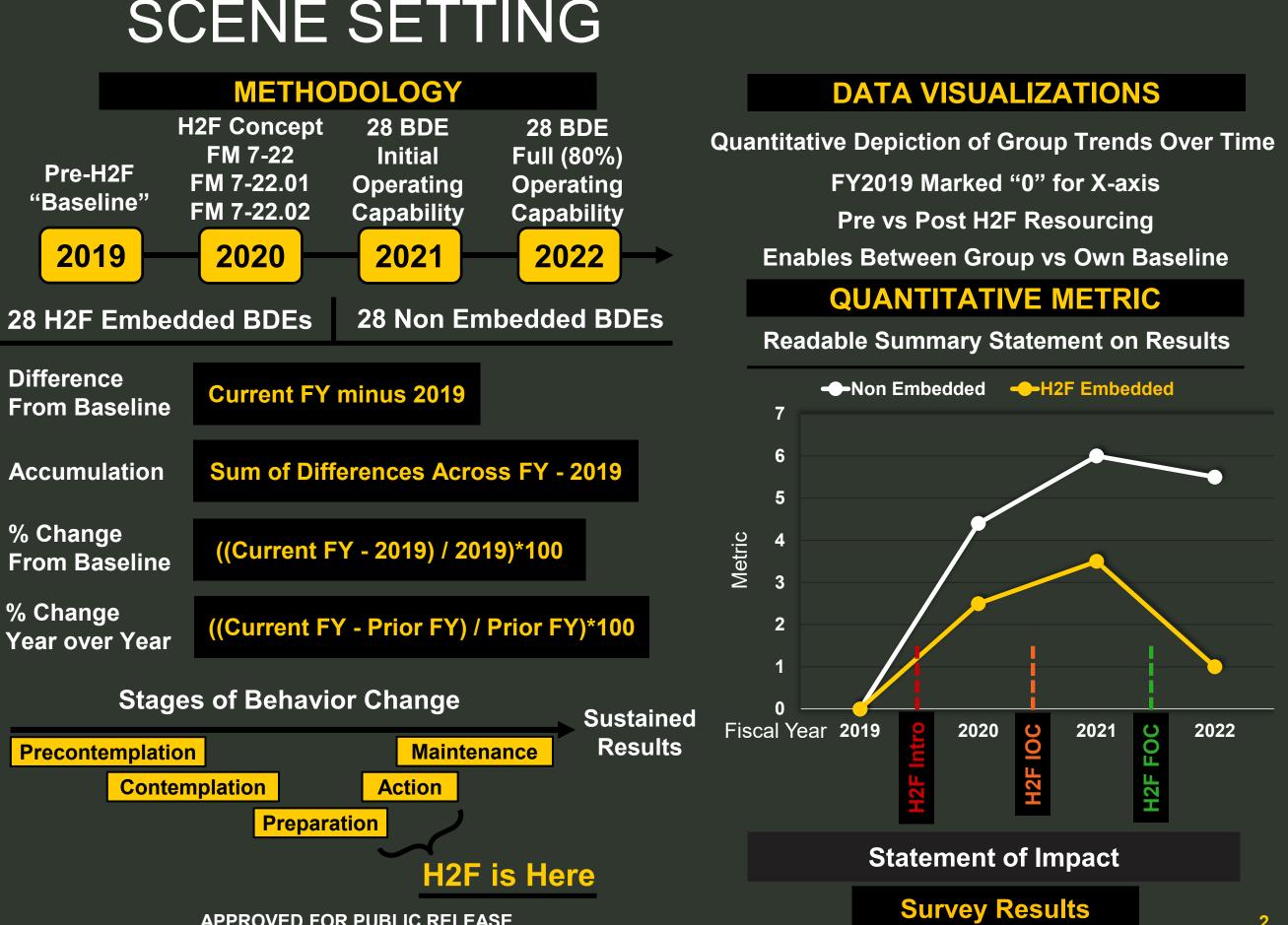


**USARIEM Provided FY Data (2019-2022)** 

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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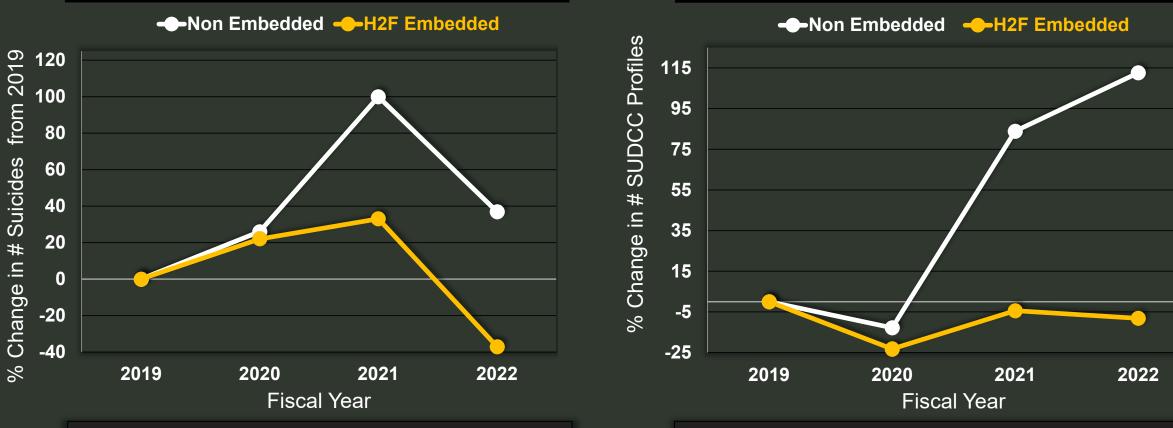
## **HOLISTIC HEALTH AND FITNESS REDUCING HARMFUL BEHAVIORS**

#### **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.

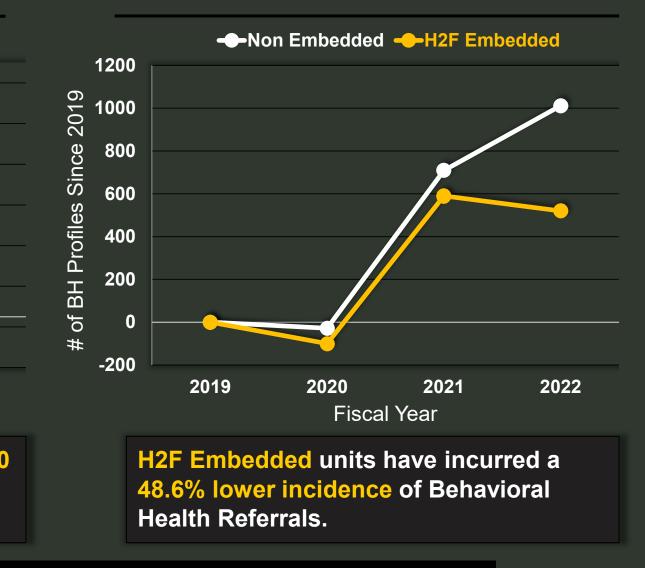


"One loss by suicide is too many. While we're working hard on this problem, we have a lot more to do." - SECDEF Austin H2F Embedded units have accumulated 470 fewer Substance Abuse Profiles over the last 3 years (vs. Non Embedded and 2019).

#### 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

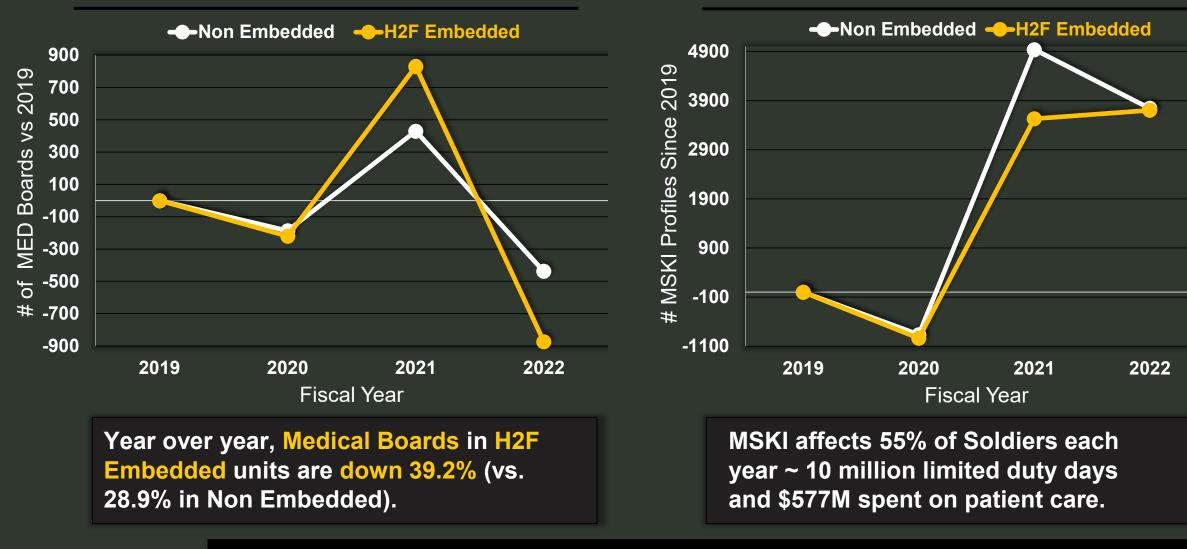
## **HOLISTIC HEALTH AND FITNESS** ENHANCING ACCESS TO PROACTIVE CARE

#### **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.

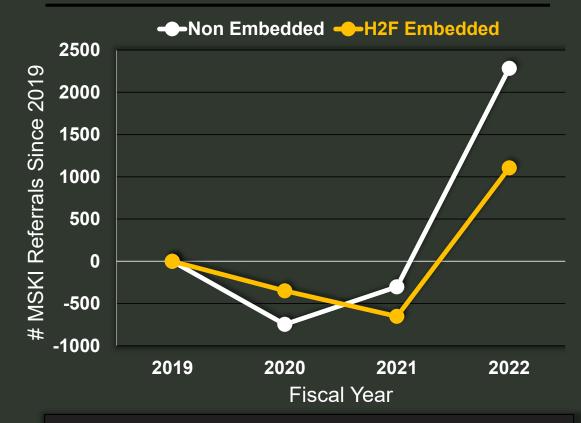


#### Soldiers in H2F Embedded units who sustain MSKI are:

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.\*

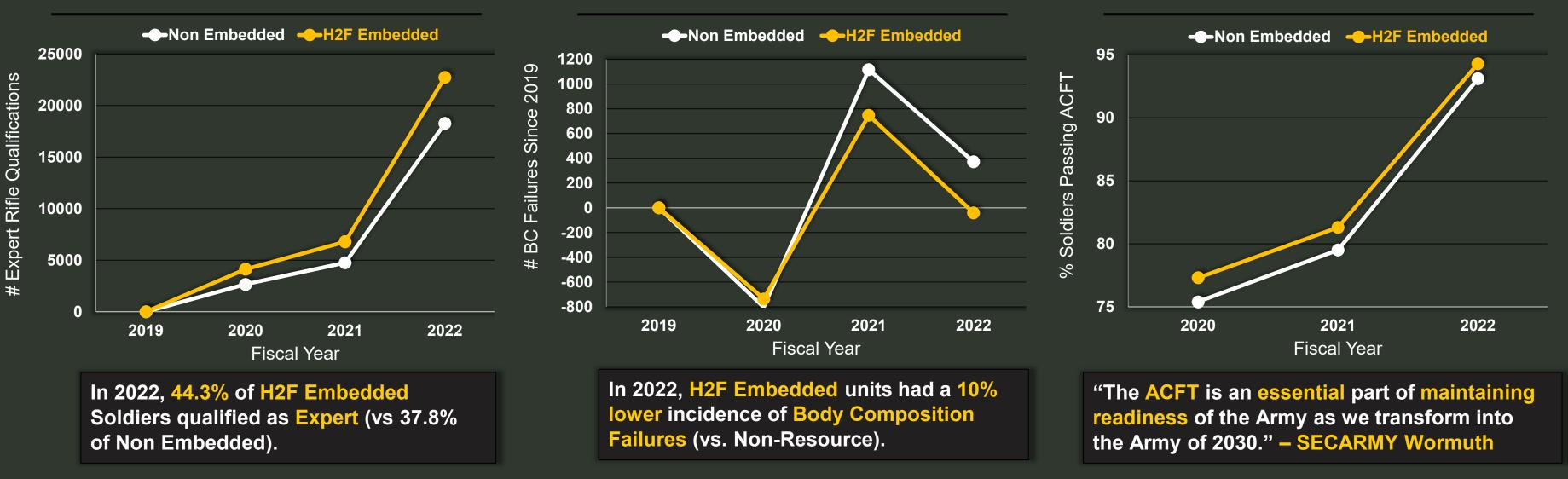
## **HOLISTIC HEALTH AND FITNESS** PUTTING PEOPLE FIRST TO OPTIMIZE READINESS

#### **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

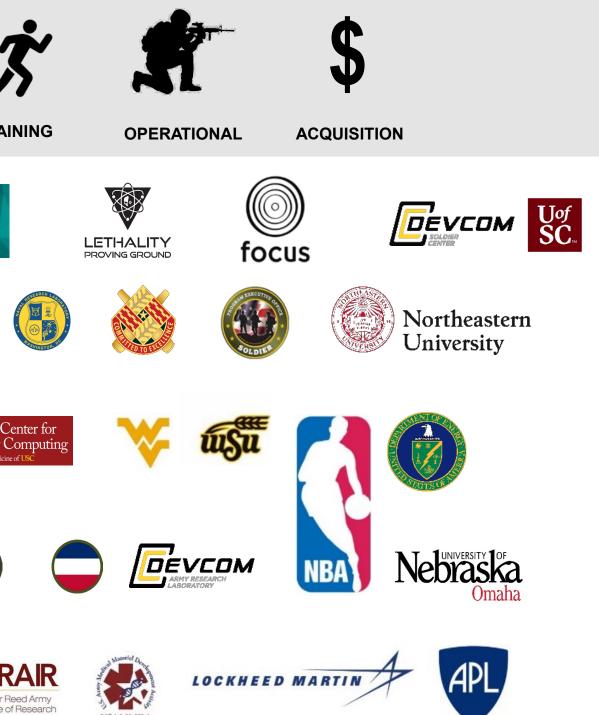


## PARTNERSHIPS

#### 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

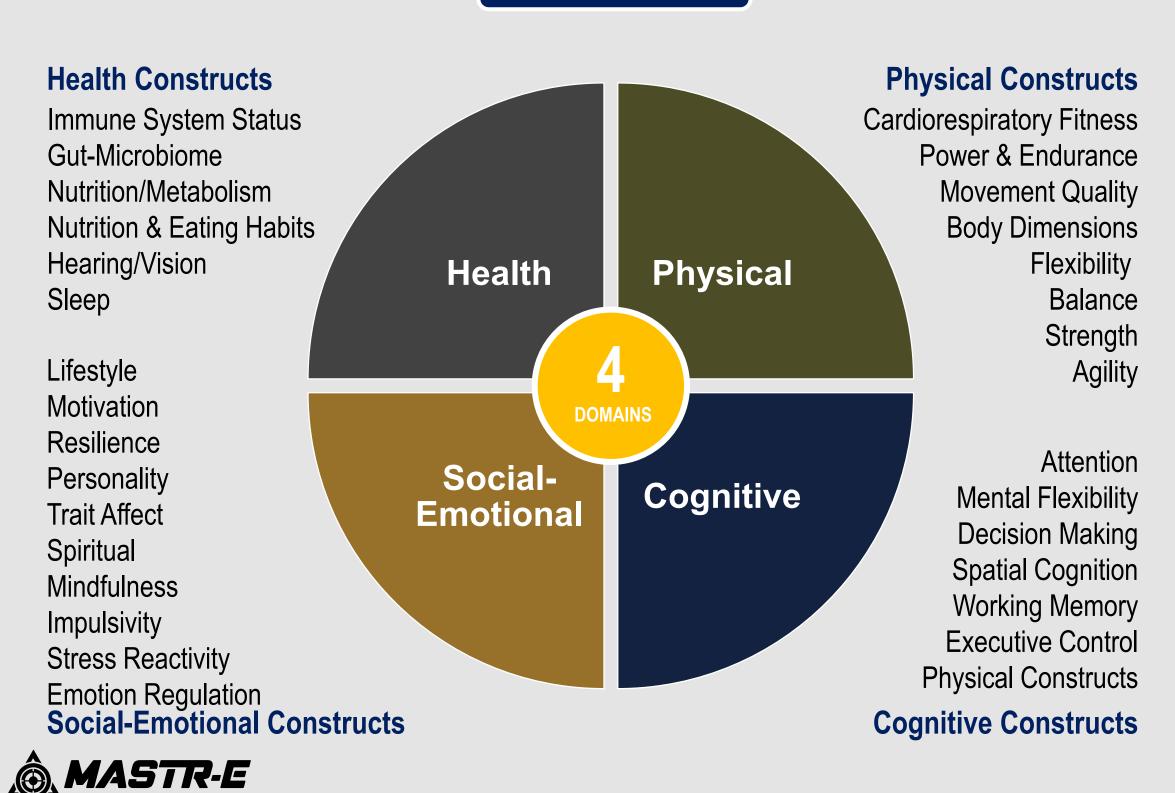






## PREDICTORS AND OUTCOMES

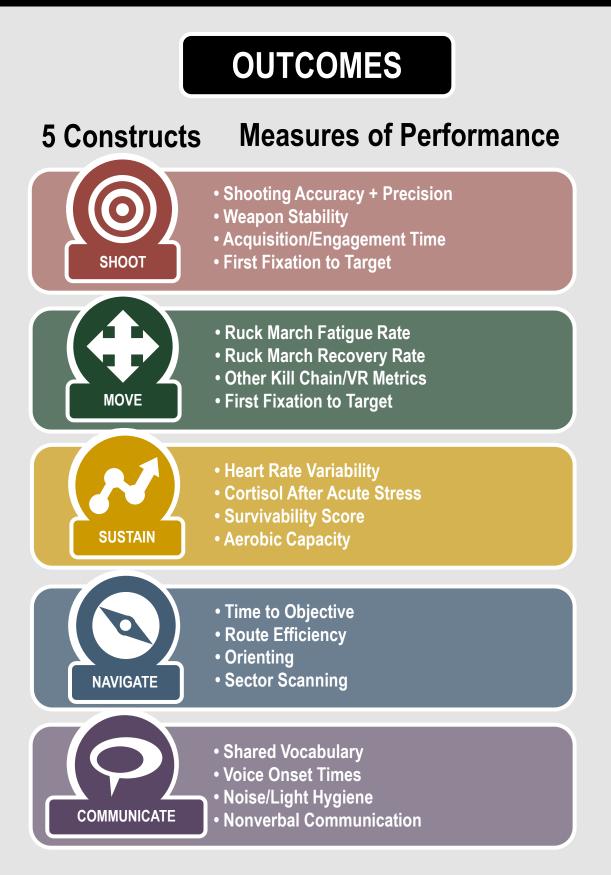
### PREDICTORS



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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



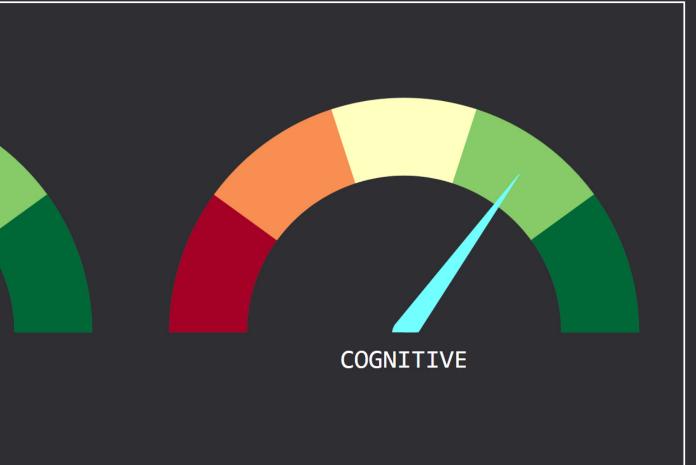


#### **RAMP-UP** READINESS ASSESSMENT AND MODEL PREDICTIONS FOR UNIT PERFORMANCE

		-	
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			





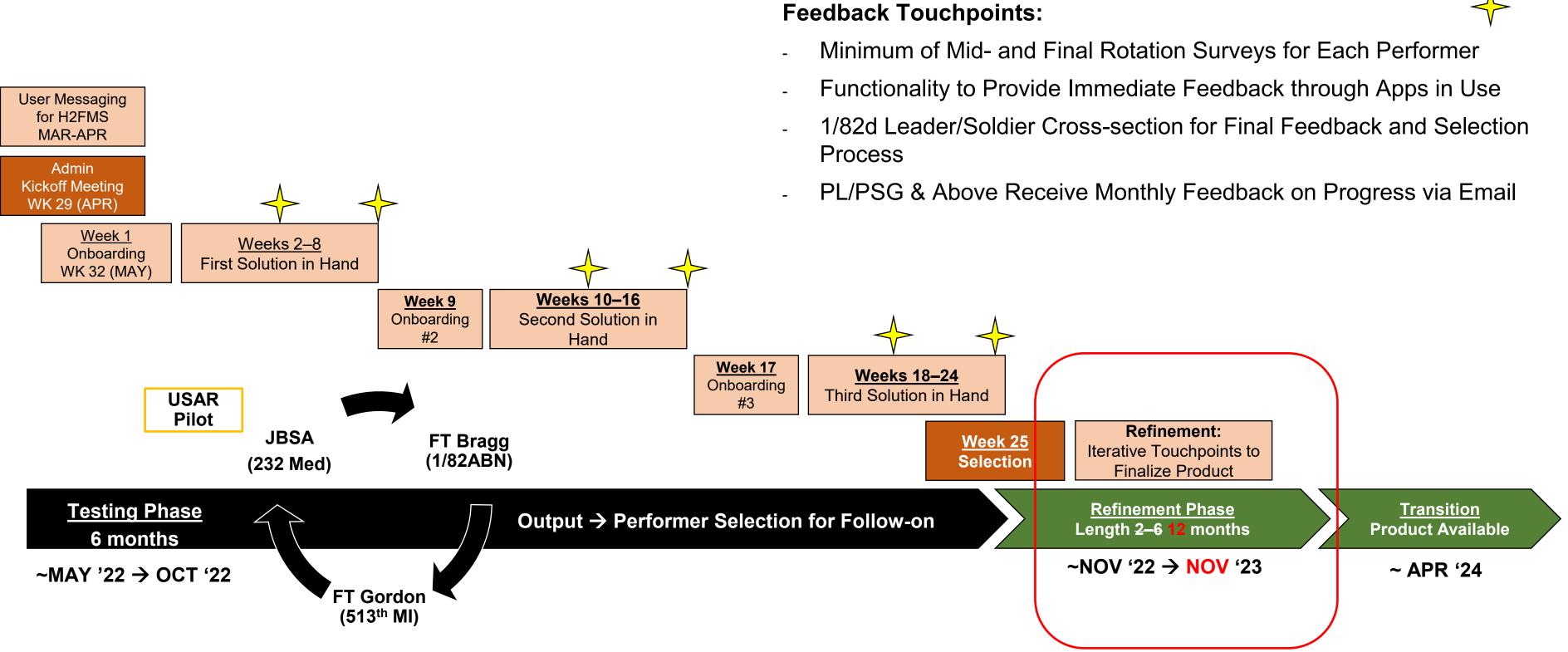




PLANNING & PROBLEM SOLVING



## **H2FMS Pilot Framework**



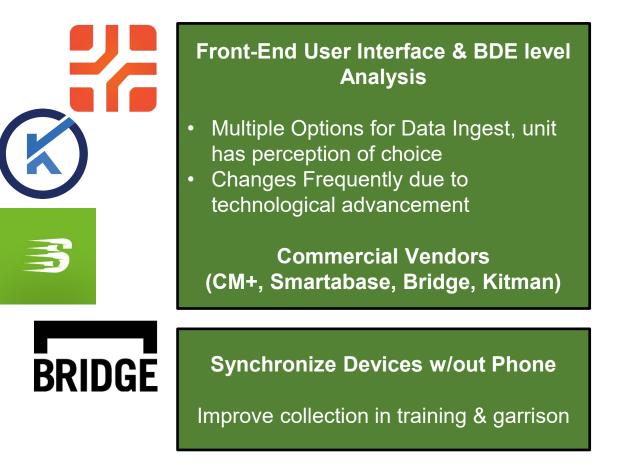
## **Refinement Phase**

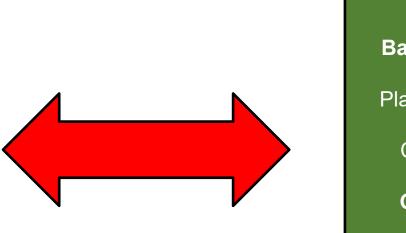
#### **Immediate Action – Phase II Enhancement**

- 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:

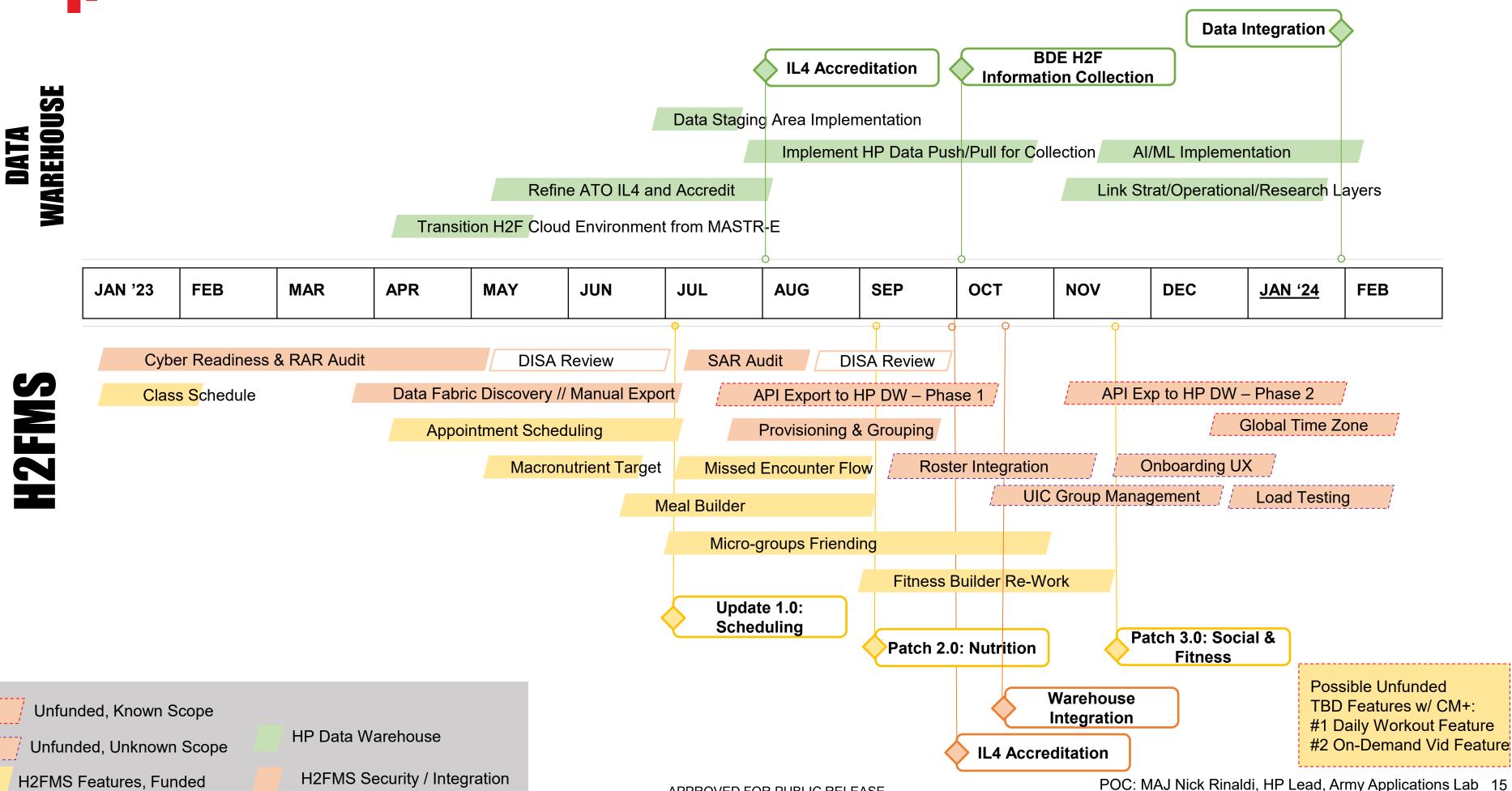
- Catalog "Rules to Play" for AMS type applications multiple applications can play, as long as they align with requirements
- Plug and play into HP Data Warehouse Owned by H2F
- MASTRE provides research developed algorithms over time to help inform
- 18ABC provides developed algorithms over time, largely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





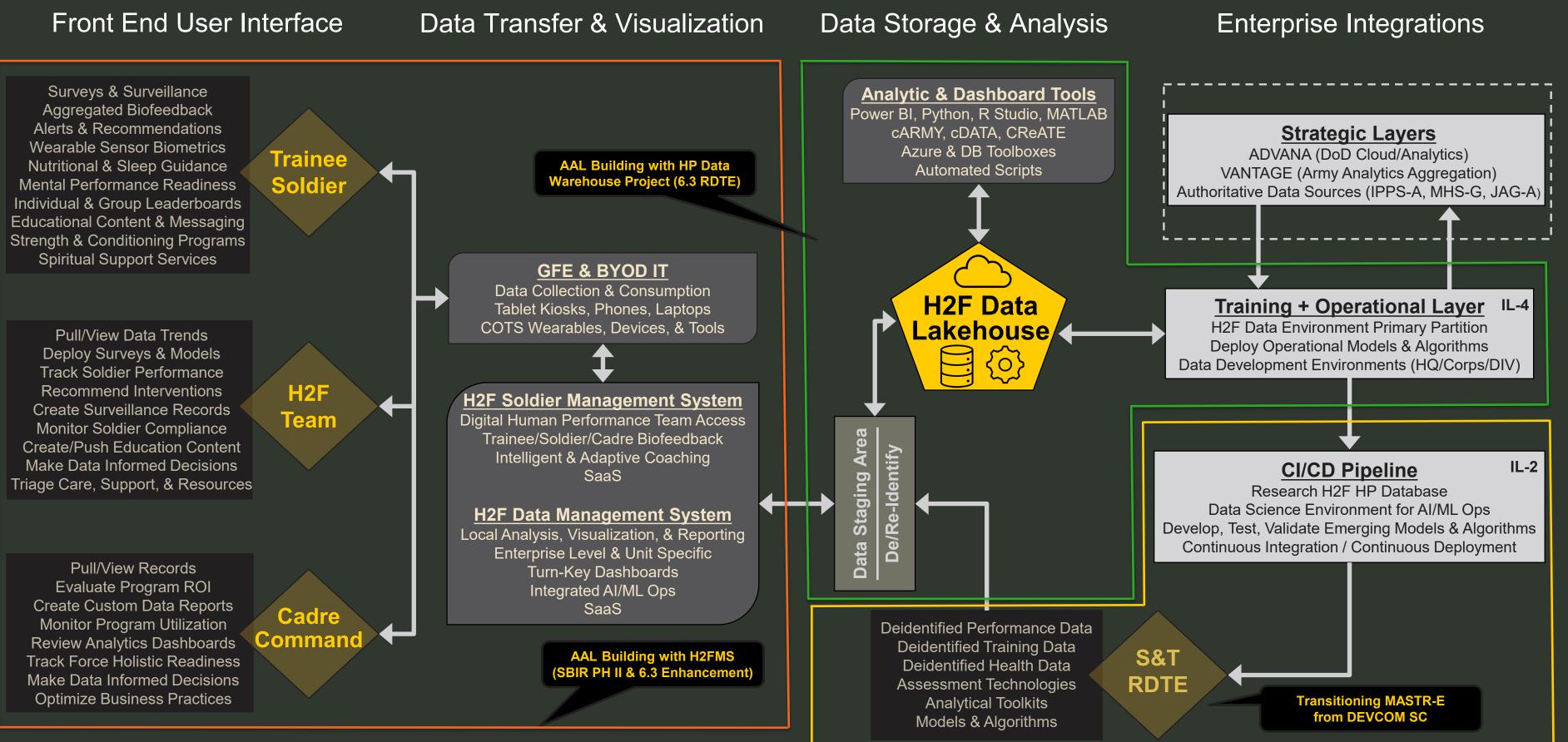






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## **H2F SOLDIER PERFORMANCE DATA ECOSYSTEM**



## **HOLISTIC HEALTH AND FITNESS**

## **RECAP & WAY FORWARD**

### H2F ROI

**Scene Setting** 

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### 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

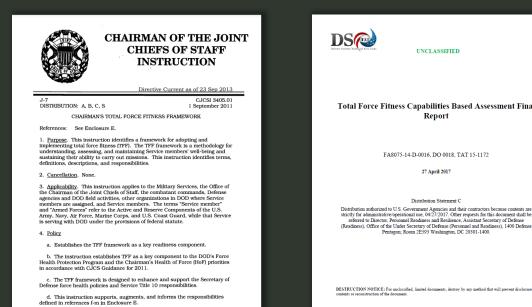


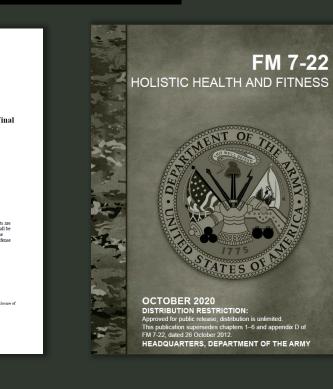
## **HOLISTIC HEALTH AND FITNESS** SHORT RANGE TARGETS: SCENE SETTING

## **DEMAND SIGNAL**

Report

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







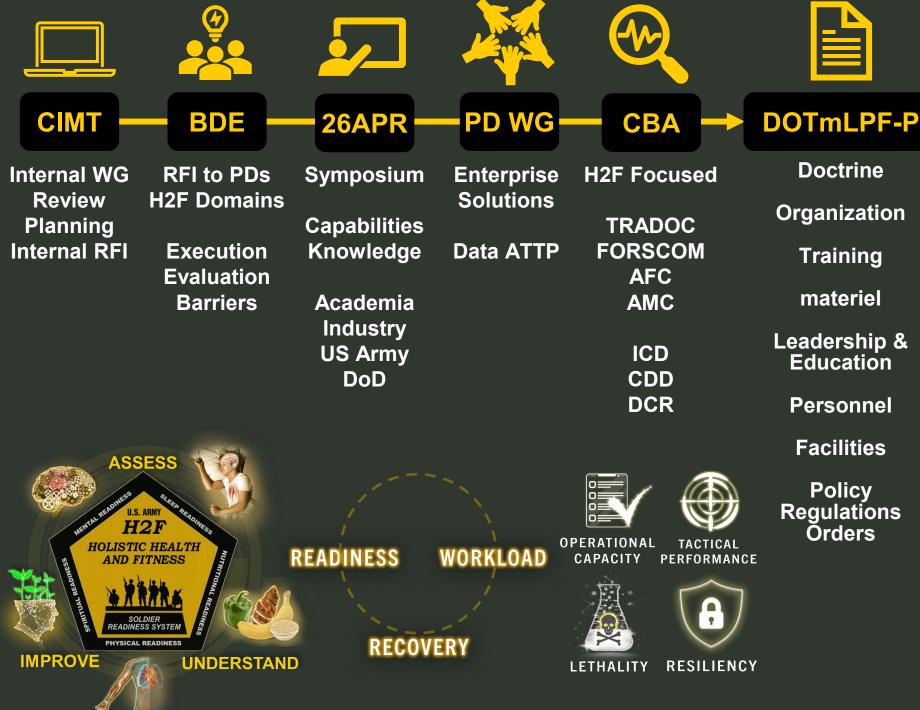
CIMT

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

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## 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 -H<sub>2</sub>F 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

## **HOLISTIC HEALTH AND FITNESS**

## RECAP

### H2F ROI

**Scene Setting** 

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

**Quantitative + Qualitative** 

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**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



### INTEGRATING **WEARABLES**

NDAA Language **COTS Wearables MSKI & Attrition** 

**Inform H2F Domains** Quantitative Qualitative

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



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