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**Ground Combat Element  
Systems**

# **Defense Advisory Committee on Women in the Service (DACOWITS)**

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# Purpose

Provide the Defense Advisory Committee on Women in the Services (DACOWITS) an update on the latest program office efforts for Personal Protective Equipment and Clothing for female Marines





# Agenda

- Program Manager, Infantry Combat Equipment (PM ICE)  
Overarching Intent/Objectives
- Fit Attribute Policy
- Anthropometric Studies
- Marine Corps Load Effects Assessment Program (MC-LEAP)
- Specific Improvement Efforts
  - Plate Carrier Generation III (PC Gen III)
  - Hard Armor Plates
  - Helmets
  - Adjustable Pack Frame
- Future Efforts



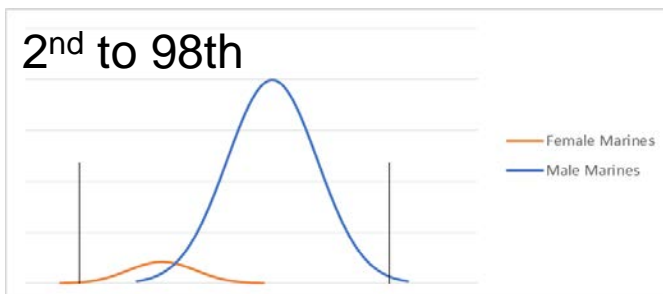
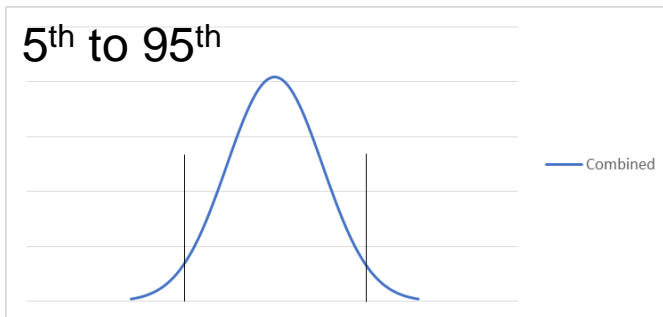
# PM's Overarching Intent/Objectives

- 1) Lighten the load
- 2) Design products with adjustability, mobility, modularity, and scalability for a better form, fit, and function for the 2% female Marine to the 98% male Marine
- 3) Maximize collaboration with other Services and leverage each others data, contracts, studies, etc. in order to field capability faster and at less cost
- 4) Account for how our equipment interfaces and integrates with other items or systems (equipping Marines as a system)



# Fit Attribute Policy

- In 2016, Marine Corps released an updated Fit Attribute Policy expanding the fit requirement for all Individual Combat Equipment to better fit all Marines
  - Previous Fit Attribute Requirement = 5<sup>th</sup> to 95<sup>th</sup> percentile Marine
  - New Fit Requirement = 2<sup>nd</sup> percentile female to 98<sup>th</sup> percentile male Marine
    - Covers and additional 8,856 smaller stature and 5,711 larger Marines (straight percentage/no attributes; height, weight, torso length, etc.)
    - Encompasses all but 249 of the smallest Marines and 3,394 of the largest Marines





## Anthropometric Studies

- Anthropometry is the scientific study of the measurements and proportions of the human body
- 2010 Marine Corps Anthropometric survey consisted of 94 anatomical measurements and full body scans from 620 females and 1,301 males.
- The 2020 Marine Corps Anthropometric survey begins in 2018 focused on ensuring the entire male and female population is represented through technically improved data collection techniques.
  - Fully equipped full body & head 3D scans.
- Anthropometry database influences clothing and equipment designs and sizing, influences design parameters for vehicles and other interfaces machines.







# Marine Corps Load Effects Assessment Program (MC-LEAP)

- Developed to measure a Marine's mobility and analyze components and effectiveness (PPE) in order to provide a better systems engineering solution focused on human systems integration and human performance.
- Two Components to MC LEAP
  - 1) The Obstacle Course.
    - Replicates selected physically demanding and commonly occurring combat activities into a repeatable methodology using 11 obstacles.
  - 2) The 15 km hike at a speed of four km/hr.





# Specific Improvement Efforts

- Marine Corps has focused on improving the overall capability and fit of currently fielded equipment to better support Marines across all missions. Recent improvements were made in the following areas:
- Body Armor
  - Plate Carrier Gen III (PC Gen III)
  - New smaller sizes of hard armor being made available
- Helmets
  - Adopting Army's Improved Retention System
- Load Bearing Equipment
  - Adjustable Pack Frame







# Plate Carrier Generation III (PC GEN III)

- The PC Gen III is a system improvement and replacement of the current USMC Plate Carrier program; provides improvements in mobility, weight, fit, and function while retaining the same area of ballistic coverage.
  - 3 additional smaller sizes (XS-S, SM-S, SM-L) and more modularity of components to better tailor the fit to the individual
  - Approx. 25% lighter
  - 1 ½ inches shorter for better mobility at the waist
  - contoured shoulders for better rifle stock weld
  - removable soft armor vest and load bearing panel to support vehicle crewman, reconnaissance, and military police
  - Improved ballistic protection capability



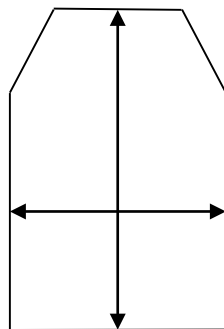
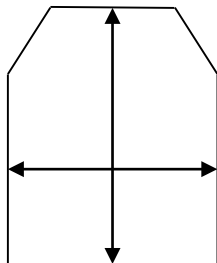
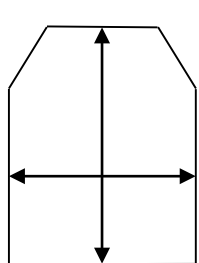


# Hard Armor/Helmets

## Hard Armor

Additional hard armor plate sizes being added to the inventory to provide enhanced sizing and fit:

- Adopting 6x6 Side Plates for additional sizing and fit capability.
- Adopting Army's 3 new torso hard armor plate sizes :
  - XS-Short
  - SM-Short
  - SM-Long



## Helmets

Adopting the Army Improved Retention System (IRS) as part of the current Enhanced Combat Helmet (ECH) procurement.

- Preferred over legacy retention systems
- Better accommodates the bun





# Adjustable Pack Frame

- The Adjustable Pack Frame (APF) is a system improvement to the current USMC Pack system. The APF replaces the current shoulder harness and hip belt assembly of the USMC Pack and provides improved fit and better compatibility with body armor at a reduced system weight:
  - Allows for simple adjustment of the hip belt up and down to accommodate different torso lengths and user preference on location of hip belt
  - Includes two sizes of yoke: narrow and regular to accommodate different shoulder breadths
  - Redesigned hip belt design for more ergonomic fit and compatibility with body armor. Comes in 5 sizes: XS to XL
  - Redesigned shoulder harness and straps for better distribution of load on shoulders
  - Removable, adjustable bolsters that correspond to hard armor plate sizes for better stability when worn with body armor





# Future Efforts

- Continuous improvement through technology insertion
  - Advancements in materials—lighter, stronger
  - Integrate improvements through Engineering Change Proposals and sustainment efforts
- Interactions with the warfighter via Combined Operational Advisory Group (COAG) meetings and operational unit visits; receive feedback on effectiveness and acceptability of PPE in the Operation Forces
- Collect user feedback through Marine Corps Center for Lessons Learned (MCCLL)
- Collection and analysis of PPE from events in theater via Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC)
- In Service Reviews (ISRs) and Post Implementation Reviews (PIR)





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Questions?

