

# ***Headquarters U.S. Air Force***

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*Integrity - Service - Excellence*

## ***Translating HSI Research into Policy and Guidance: Successes and Challenges Across the Services***



**NDIA 26th Annual Systems & Mission  
Engineering Conference  
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Air Force Science & Technology Management  
Division (SAF/ AQRE)**



# Overview

## Outline / Agenda

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### Air Force HSI Policy Efforts in Anthropometry

#### ■ Background –

- Maximizing Our Number of Personnel, Fully Drawing on Their Talent  
HKECUHS0
- Stakeholders in Research and Policy
- Planned & Ongoing Research
- Plans to Translate Research into Policy  
HKECUHS1

#### ■ Planning & Execution

- Broadening Anthropometry Requirements & Applicability
- Weaving Anthropometry into Existing Publications
- Keeping Policy Synchronized with Research for Future Updates

## Slide 2

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**HKECUHS0** Not a required update, but I'm sensitive to works like "manpower" and "man hours" - I like to use gender neutral terms like person hours, or in this instance we could use "Force" or "Total Force" - again, just a personal preference, not a required edit, but if you fix it here, recommend fixing elsewhere for continuity

HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:46:52.735

**HKECUHS1** No space between in and to

HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:47:08.880



# Background

## *A Need for Improved Anthropometry Policy & Guidance*

### *Maximizing Our Number of Personnel, & Fully Drawing on Their Talent*

- What would our leadership think if we told them that **over 1/3 of our munitions were unusable** with our current weapons because those weapons could not fit those munitions' shape? HKEC
  - This parallels the case with a significant portion of our **aircrew** – who are **capable** of training and flying missions across a variety of aircraft, but only a **limited** set of **aircraft** are **capable** of **accommodating them** with their **physical dimensions**
    - This problem extends to **all positions on our aircraft** – not just pilots, also weapon systems operators, EW operators, etc. – qualified, yet unable to apply their talents
  - The USAF **population** has **diversified** across gender, race, and other demographics in the last several decades, **widening** the **range** of **physical dimensions** that our aircrafts need to **accommodate**
  - **Prioritizing anthropometric accommodation** in our aircraft designs will enable us to draw on the **largest pool possible** of potential **talent** that our nation has to offer

### Slide 3

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**HKECUHSO** I really do love this message - it's a super powerful perspective - the one thing I would highlight here, and you can do it in your words rather than changing the slides, is to highlight that it's all aircrew positions - not just pilots. It's weapons systems operators, safety chase/photo chase camera operators (many of whom are enlisted, and many of whom are males who do not reach the height requirement...), it's EW operators, it's all aircrew positions

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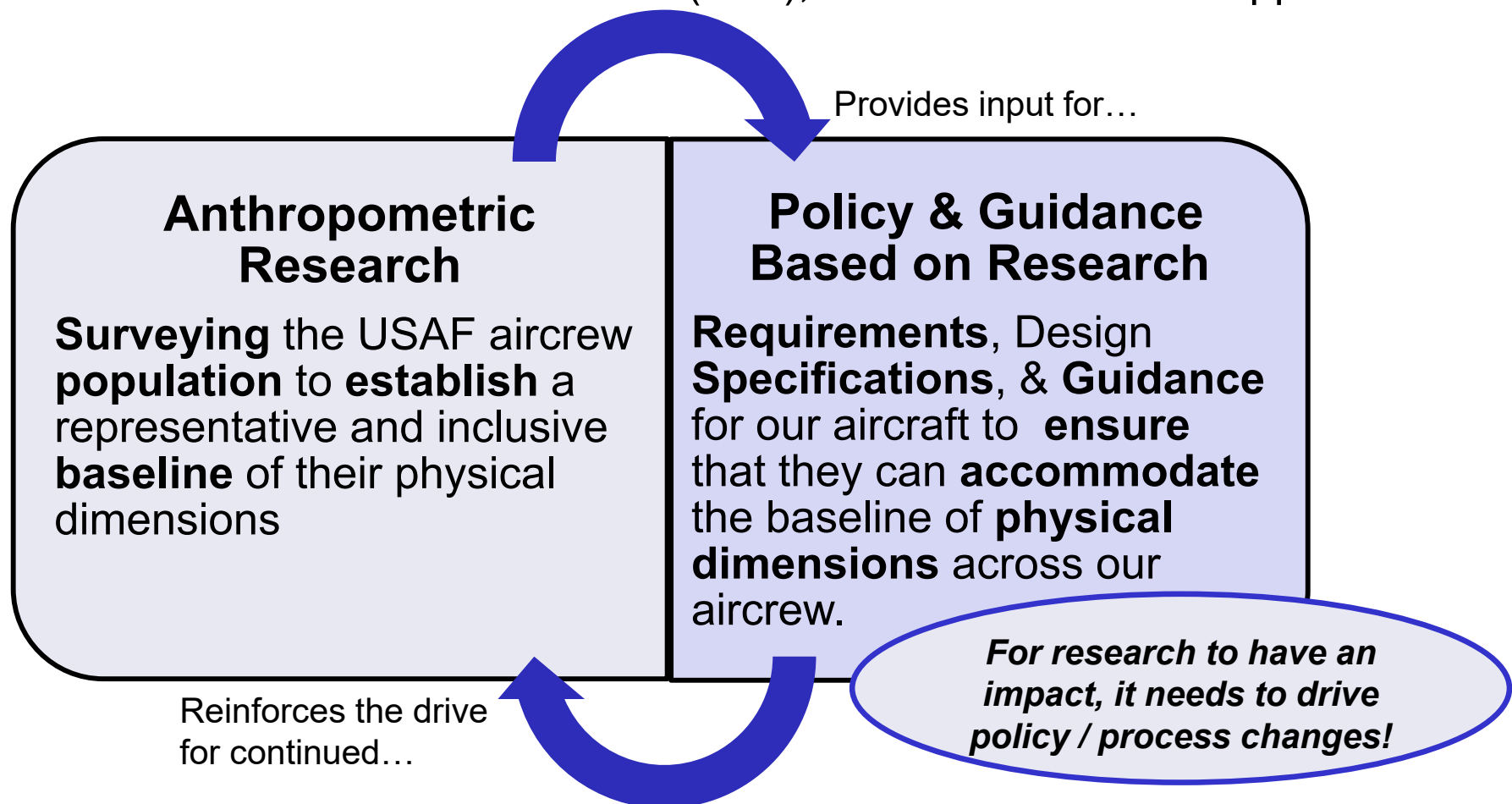


# Background

## A Need for Improved Anthropometry Policy & Guidance

### *Bridging the Research “Valley of Death” by Reflecting it in Policy & Guidance*

- To address this, the Air Force **Lifecycle Management Center (AFLCMC)**, along with the DAF **Women’s Initiative Team (WIT)**, have advocated the approach of:





# Background

## Stakeholder Organizations & Their Roles

### Key Players in USAF Anthropometry Research & Policy

#### ■ **DAF Women's Initiative Team (WIT)**

- This team advocates for **efforts** that **address issues** across the AF which **disproportionately affect women** – in this situation, restrictive aircraft designs that do not adequately accommodate smaller physical dimensions.
- Their **efforts** include organizing and reporting on **anthropometry research** to **gather measurements** that are **representative** of the U.S. **recruiting population**.
  - They also provide **recommendations** for **funding follow-on research** and **policy efforts** based on results of research.

#### ■ **Air Force Lifecycle Management Center (AFLCMC/EZFC; AFLCMC/WNU)**

- The **Crew Systems Engineering** and HSI Enterprise Branch (EZFC) and the **Human Systems Division (WNU) Airmen Accommodation Lab (AAL)** have been collaborating with the WIT to **conduct long-term studies** (FY24-26+) to obtain **up-to-date body measurements** of the U.S. recruiting population. (DAFGM2021-63-01)
- They are also a focal point for **reviewing and validating** minimum **anthropometric design specifications** for new program designs and modifications. (DAFGM2021-63-01)



# Background

## Stakeholder Organizations & Their Roles

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### Key Players in USAF Anthropometry Research & Policy

- **Office of the Assistant Secretary of the Air Force for Acquisition, Technology and Logistics (SAF/AQ);**
  - They have a key role in **writing** and **reviewing** USAF **policy** and **guidance**:
    - “Prepares policies for approval and issues official guidance via official Air Force publications,” and has overall responsibility for acquisition of systems, including product support, for the Department of the Air Force”. (HAFMD 1-10)
  - Also **published** (and re-issued) [DAFGM2021-63-01, \*Anthropometric Design Specifications for the Department of the Air Force \(DAF\) Acquisitions Programs\*](#) and have played a significant role in coordinating / publishing [Integrated Lifecycle Management](#) policy and guidance (i.e., [DAFI 63-101/20-101](#) and [AFPAM 63-129](#))





# Background

## Stakeholder Organizations & Their Roles

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### Key Players in USAF Anthropometry Research & Policy

- **USAF Aviator, Combat Systems Officer (CSO), and Maintainer Communities**
  - As the **operators** and **maintainers** of USAF aircraft, they will be **affected most directly** by the ongoing **anthropometry research**, and the consequent policy changes and additions that follow as a result.
    - They are key **participants** in this research, and thus may offer perspectives and considerations beyond those of other stakeholder organizations.
  - **Each role** (i.e., aviation, CSO, maintainer) **varies** in the types of **physical interactions** with each USAF aircraft
    - Future efforts in research and policy will establish a **set of anthropometric standards for each role** to ensure that qualified personnel do not end up ineligible for any specific position.



# Background

## Ongoing Efforts to Translate Research Into Policy

### Creating Combat Systems Officer (CSO) Specific Anthropometry Standards

Currently, **CSOs do not have their own independent anthropometric standards** to determine whether they are eligible to train/fly USAF aircraft - they instead **use the pilot-specific** stature requirements, which could potentially **exclude qualified candidates** that are otherwise eligible to fly as CSOs.

Research Effort	Policy Effort	Expected Impact
Determine the <b>physical dimensions and attributes required to perform CSO role</b> in each USAF aircraft	Create <b>CSO-specific anthropometric standards</b> based on these results	<b>Increase potential number of eligible personnel</b>  (by not inadvertently excluding them based on pilot-specific standards)

HKI

**Slide 8**

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**HKECUHSO**

**QUALIFIED candidates!!**

HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:52:59.266



# Background

## Ongoing Efforts to Translate Research Into Policy

### Broadening Career Enlisted Aviator (CEA) Anthropometric Measurements

Currently, the **anthropometric measurements** used to **determine** USAF CEA **eligibility** to train/fly aircraft are largely **focused on** one's overall **stature**. Using **additional measurements** (e.g., sitting height, arm reach) **will provide** a better representation of **eligibility**, and **exclude fewer CEAs** of smaller **HKECUHS0** from flying.

Research Effort	Policy Effort	Expected Impact
Determine the extent and type of additional <b>physical measurements beyond stature</b> in each USAF aircraft that can determine or indicate eligibility to fly.	<b>Expand</b> upon existing anthropometric standards to <b>include</b> these <b>additional measurements</b>	<b>Increase</b> potential <b>number</b> of eligible <b>personnel</b>  (by not inadvertently excluding them based solely on stature measurements)

**Slide 9**

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**HKECUHSO** Let's be more forceful here, and on prev slide too - it WILL provide a better data set of eligibility  
HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:53:49.544



# Background

## Ongoing Efforts to Translate Research Into Policy

### Ensuring Anthropometric Design Standards Reflect the Current Population

Currently, the **minimum design standards** for the **range of physical dimensions** that USAF programs **must accommodate** are **decades old** and **do not at all reflect** the **current** central **95%** of aircrew population physical dimensions. If not updated, programs **will continue** to have **unnecessarily limited pools** of aircrew.

HKECUHS0

HKECUHS1

Research Effort	Policy Effort	Expected Impact
Gather <b>anthropometric measurements</b> from a <b>representative sample</b> of the USAF population to obtain a <b>current baseline of physical dimensions</b>	<b>Update</b> the <b>use cases</b> for <b>physical dimensions</b> that aircraft must accommodate so that they <b>reflect</b> the <b>new baseline</b> of anthropometric measurements	<b>Increase</b> potential <b>number</b> of eligible <b>personnel</b>  (by not excluding personnel based on out-of-date use cases for aircraft physical accommodations)

**Slide 10**

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**HKECUHS0** will  
HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:54:17.111

**HKECUHS1** DECADES OLD  
HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:54:26.904



# Background

## A Need for Improved Anthropometry Policy & Guidance

### A Temporary Measure – The Limitations of Guidance Memos (GMs)

- HKECUHS0
 ■ In 2020, SAF/AQ published a Guidance Memo (GM), [DAFGM2021-63-01](#) (“[Anthropometric Design Specifications for the Department of the Air Force \(DAF\) Acquisitions Programs](#)”), to provide mandatory anthropometric design specifications for new DAF acquisitions programs and modifications to existing programs.
  - However, this GM **must be re-issued annually** to retain its applicability, otherwise it **expires** and is no longer effective. The memo expired in 2022.
- To mitigate this risk, SAF/AQRE drafted proposed language in that takes the GM’s requirements and maps them to [DAFI 63-101/20-101](#) (“[Integrated Lifecycle Management](#)”), and [AFPAM 63-129](#) (“[Air System Development and Sustaining Processes and Procedures](#)”) as proposed policy and guidance changes.

***Bottom Line: When it comes to anthropometry in acquisitions, we need permanent solutions that are codified and lasting.***



**Slide 11**

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**HKECUHS0** I love this slide - it shows how GMs are good band aids but that we need permanent solutions that are codified and lasting  
HARRIS, KAITLIN E CIV USAF HAF , 2023-09-27T17:55:05.101



# Planning & Execution

## Establishing a Course of Action

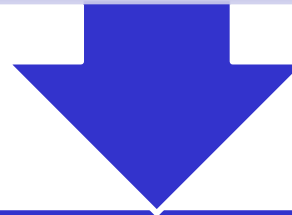
*To re-incorporate the anthropometry requirements in a more permanent matter, the following course of action was planned out:*

### *Part 1: Transferring Requirements from the DAFGM into More Permanent Policy*

**Analyze & Compare Existing AF Policy & Guidance Docs**

**Break Down Guidance** from Expired Memo

**Determine** Where the **Best Fit** is for the Memo Language



### *Part 2: Keeping Anthropometry Specifications & Guidance Up to Date*

**Sync up** with AF anthropometry **research** efforts & results

**Estimate timeframe** to propose changes based on research results

**Establish a rhythm** for regularly incorporating updates into guidance



# Planning & Execution

## Part 1: Transferring the DAFGM into More Permanent Policy

### Step 1a: Analyzing & Comparing AF Policy & Guidance

<b>DAFI 63-101</b> (AF Integrated Lifecycle Management Policy)	<b>AFPAM 63-129</b> (AF Air System Development & Sustainment)	<b>DAFGM2021-63-01</b> (DAF Anthropometry Guidance Memo)
<b>Longer coordination time</b> – many orgs with equity; more comments. <b>(4-24 months)</b>	<b>Shorter coordination time</b> – fewer orgs with equity in the coordination process; comment adjudication, revision, and publication are faster. <b>(6-12 weeks)</b>	
<b>Policy</b> – directive requirements that are <b>mandatory for DAF acquisitions programs</b> to follow (unless waived).	<b>Guidance</b> – Details on responsibilities, procedures, design specifications, and best practices that DAF acquisition programs are <b>expected, but not required</b> , to follow.	
<b>Indefinite</b> duration – stays in effect unless superseded.		<b>Temporary</b> duration – must be renewed / re-issued <b>annually</b> .
<b>Addresses HSI in broad terms</b> ; references more in-depth HSI documents like <i>AFPAM 63-129</i> .	<b>Addresses a portion of HSI</b> : Crew Station / Maintainer Interface WGs; Anthropometry (New)	<b>Solely addresses anthropometry</b> as its topic area.



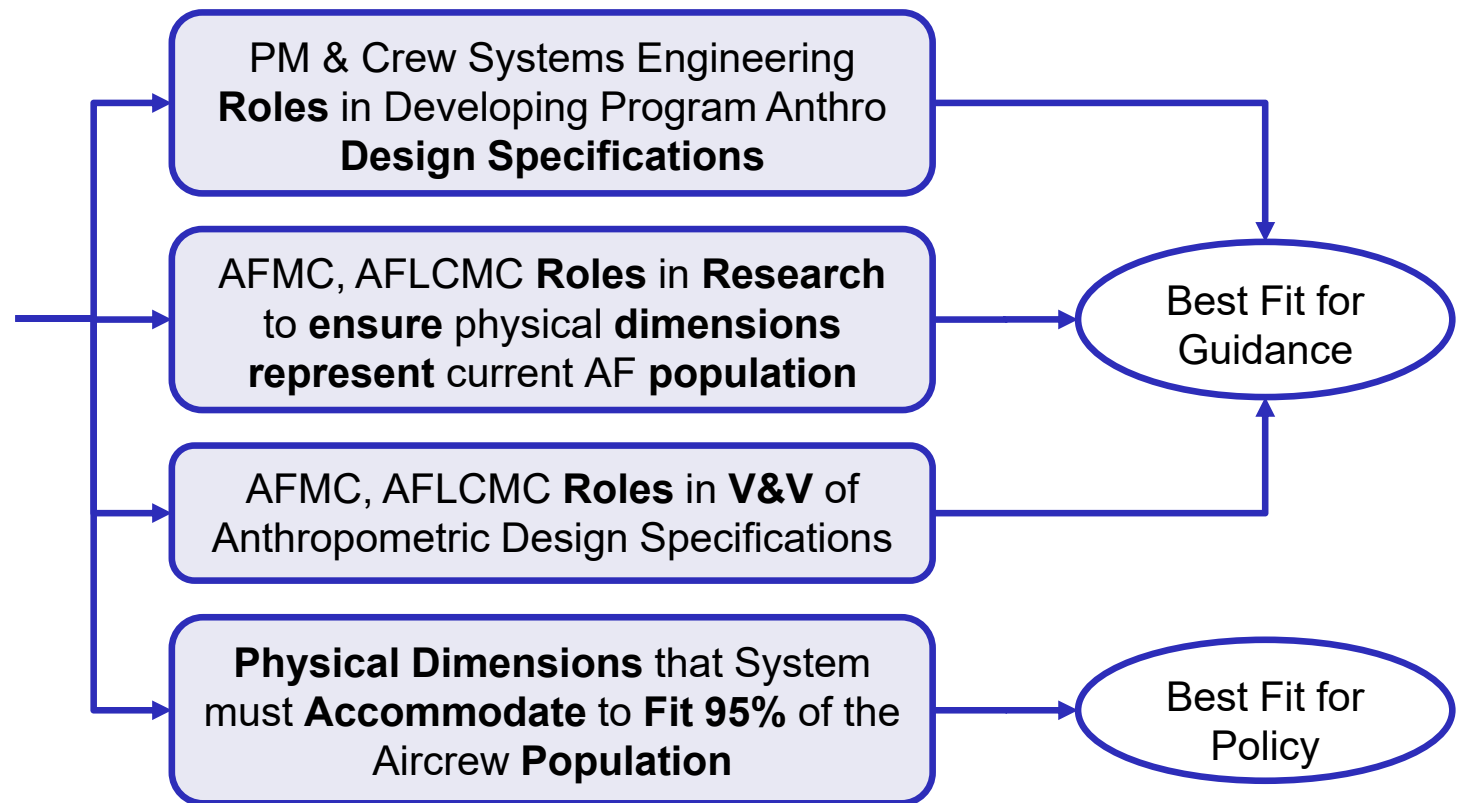
# Planning & Execution

## Part 1: Transferring the DAFGM into More Permanent Policy

### Step 1b: Breakdown Anthropometry Guidance from Expired Memo



**DAF Anthropometry Guidance Memo (Expired)**

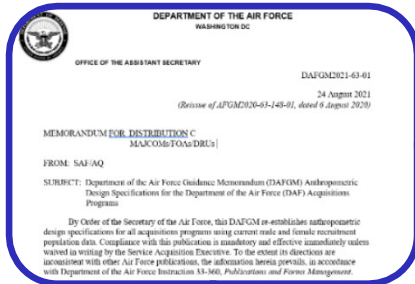




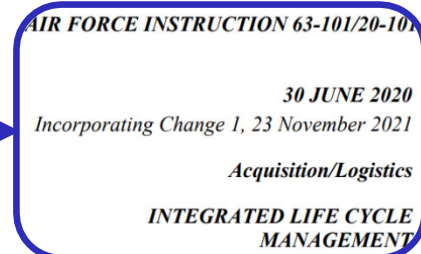
# Planning & Execution

## Part 1: Transferring the DAFGM into More Permanent Policy

### Step 1c: Determine Where to Best Fit Each Part of the Expired Anthro Memo



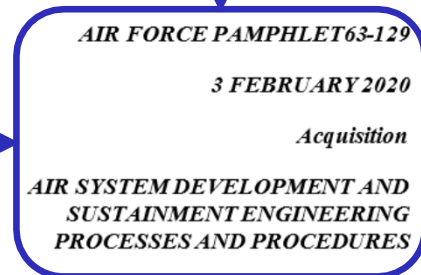
**Directive Requirement** for DAF acquisition programs to accommodate the physical dimensions specified in **AFPAM 63-129**



***Rationale: Keep the content that is most likely to change (i.e., the physical design specifications) down in guidance documents, where they will take much less time to coordinate and revise.***

**References**  
**AFPAM 63-129** as the source of **most current** minimum anthro **design specifications**

**Roles & Responsibilities** regarding anthropometry for PMs, Lead Commands, AFLCMC & AFMC



**In-depth design specifications** – a set of human **physical dimensions** that programs must accommodate to be able to **fit at least 95% of aircrew population**



# Planning & Execution

## Part 2 : Keeping Guidance & Specifications Up to Date

### Step 2: Proposed Plan to Keep Specifications and Guidance up to date

Analysis & Results from anthropometry research efforts

- Estimate how long formal coordination and revisions will take on particular guidance document
- Discuss with research organizations; compare to ongoing research schedule
- Establish regular intervals between each set of proposed changes going forward

- Submit proposed policy changes to office that owns the corresponding policy / guidance document
- Obtain an estimate of timeframe to adjudicate and accept / reject changes

- SAF/AQRE meets with the organizations running each effort to discuss and ensure mutual understanding on latest results
- SAF/AQRE drafts and discusses proposed policy changes based on results

Establish a schedule for incorporating research into guidance & policy

Proposed changes based on results





# Questions?

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# ***BACKUP***

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## ***BACKUP SLIDES***





# Planning & Execution

## Initial Plan & Lessons Learned

### Lesson Learned: Make No Assumptions About Continuity of Policy / Guidance

- In Q1 2022, SAF/AQRE proposed weaving the contents of *DAFGM2021-63-21* into *DAFI 63-101/20-101* as it entered formal coordination, letting the memo expire under the assumption that *DAFI 63-101/20-101* revision & publication would be complete before its expiration. When this assumption did not prove true, efforts shifted to preventing this lapse from recurring.

### Anthropometry Effort Tracker

KEY: Estimated Duration  
Actual Duration (Beyond Estimate)

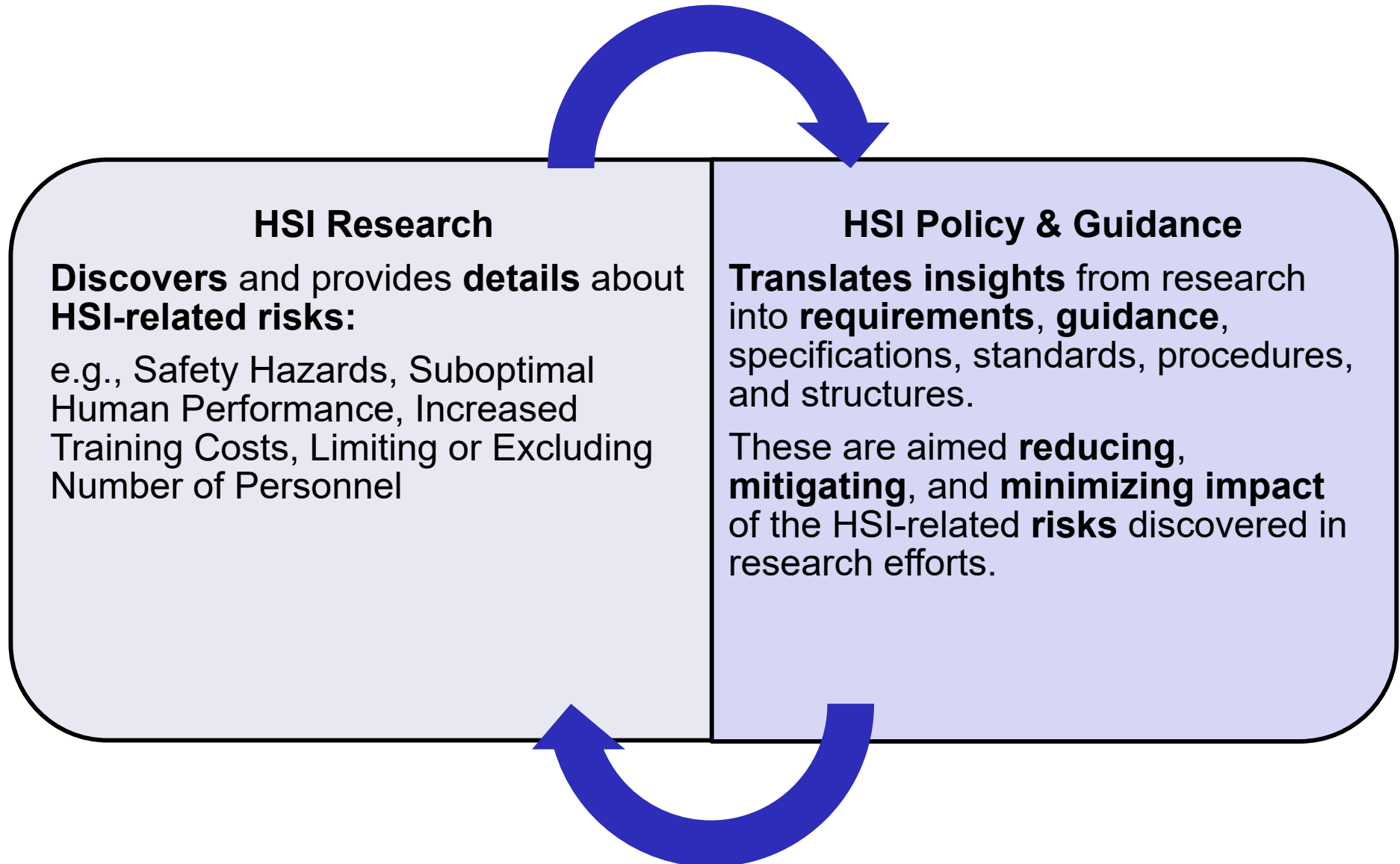
EFFORT	ESTIMATE DURATION	ACTUAL DURATION	2021				2022				2023				2024				2025			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>DAFI 63-101/20-101: Formal Coordination</i>	Feb 2022 - Jul 2022	Feb 2022 - Feb 2023																				
<i>DAFI 63-101/20-101: Adjudicated, Revised, Published</i>	Jul 2022 - Nov 2022	Jul 2022 - May 2023																				
<i>DAFGM 2021-63-01: Active for This Duration</i>	Aug 2020 - Aug 2022	Aug 2020 - Aug 2022																				
<i>DAFGM 2021-63-01: Language Not in Effect</i>	Aug 2022 - Aug 2022	Aug 2022 - May 2023																				
<i>Research → Policy: Create Aircraft Anthropometry Standards for CSOs (Combat Systems Officers)</i>	Feb 2023 - Oct 2024	TBD																				
<i>Research → Policy: Broaden Anthropometry Metrics used for CEAs (Career Enlisted Aviators)</i>	Sep 2022 - FY24	TBD																				
<i>Research → Policy: Ensuring Anthropometric Design Standards Reflect the Current Population</i>	Jan 2023 - Oct 2025	TBD																				

**Gap between SAF/AQRE estimate and publication of DAFI 63-101/20-101**



# Overview

## The Relationship Between Research and Policy





# *Tying into the TAG Theme*

## *Food for Thought: How Does Focusing on Anthropometry Encourage Us to View Humans as Assets, Rather Than Liabilities?*

- As our own and adversaries' computing **capabilities advance**, **decisions** and their corresponding **actions** will likely need to be made and executed on an **increasingly rapid** and **compressed timeframe**.
  - This **may create a capability gap** that unmanned systems could struggle to address – the **latency between control stations** and their **unmanned systems** inducing a **time lag** for commands, confirmations, and SA.
  - In this case, where **latency limits response times** to unworkable levels, the **advantage of humans** become apparent – a human in the cockpit can make and execute decisions (and maintain SA) at the rapid pace their mission environment demands.
  - By designing HMI with a focus on anthropometry and ergonomics, we can minimize the physical actions required to reduce the lag between decisions and actions