

RFI Category and Number: Women in Aviation RFI #8

RFI Question:

8a: What actions have been take or will be taken to accommodate the physiological differences in women verses men since aviation positions have been opened to women? Pertaining to aircraft, flight gear, training.

RFI Response:

- Women are given the choice of choosing women's or men's Flight Suit during the initial fitting. Depending on build, some women have chosen to wear the men's flight suit.

- Some women are unable to achieve a proper fit in a PCU-78 harness, this may require sending some females to be evaluated for custom fit harnesses at NAWA China Lake, CA.

- Significant progress has been made to accommodate Flight Boots sizes ranging from size 3-16, which covers the wide range of female sizes.

- Significant progress has been made to accommodate Flight Gloves sizes ranging from size 4-12, which covers the wide range of Female and Male sizes.

- Updating female urinary director adaptor procurement for in-flight mission usage.

- There has been instances with O2 Masks not fitting a smaller face and obtaining a good seal, The Pilot and/or Aircrew would need to travel to GENTEX West in Rancho Cucamonga CA to be fitted for a liner or mask. Recommend PMA-202 look into testing an Extra-Extra Small/ Narrow Mask.

- Adding extra padding in the helmets because small size helmets are too big, with approval in writing from the AMSO Officer in accordance with NAVAIR 13-1-6.7-2 Chap 7. The Pilot and/or Aircrew would need to travel out to GENTEX West in Rancho Cucamonga CA to be fitted for a liner or helmet. Recommend PMA-202 look into testing and fitting of a small size helmet, currently a Medium size helmet is the smallest size available.

- G-Suits should have an extra small size. Currently the smallest size (small regular) fits 131-160 lbs. 63" frame. There are women that are shorter than 63" and less than 131- 160lbs. The nude weight envelope for the T-6A/B ejection seat is 103-231lb. In addition, having to pleat G-Suits usually around the waist, thighs, and calves to achieve a proper fit while pulling the strings as tight as they'll go, some have been reported to still be too big. An Extra Small G-Suit could be tested and procured for small statured women or men, shorter than 63" frame (and 103-131lbs).

- Aircraft seats have been modified to count for lighter aircrew members, increased the seat bucket upper height (so smaller aircrew could move up an extra inch for better visibility) and added a moveable backrest to help increase reach on the pedals.

- (USN) T-6 configuration seats (Martin-Baker US16LB) are certified for 103-231lbs (nude weight).

- (USN) T45 A/C configured seats (SJU-17A(V) 5/A, 6/A) are certified to 136-213lbs (nude weight).

-The catapult ejection seat system was re-designed to reduce potential spinal injury with lighter occupants.

RFI Question:

8b: What are the anthropomorphic measurement requirements for service as a pilot? Service as Air Crew? When were these requirements established?

RFI Response:

The anthropomorphic measurement requirements for service as a pilot or aircrew vary by aircraft. The requirements are found in NAVAIR M-3710 which is included as enclosure (1). The current instruction is dated 2017.

Pilots, Naval Flight Officers, and Aeromedical Officers are compared against the Anthropometric Restriction Codes (ARC) for each aircraft platform, which is promulgated by NAVAIR. ARCs are considered limitations and no Anthropometric waivers shall be granted. No Anthropometric restrictions exist for enlisted aircrew positions and they do not get anthropometric measurements.

As per OPNAVINST 3710.37A NAVAIR is designated as the overall Aircrew Anthropometric Engineering Program manager. Responsibilities include determining the scope of naval aircraft requiring anthropometric measurements, the resources required to measure aircraft crew stations, analyzing and developing anthropometric measuring procedures, identifying AR codes and crewmember weight restrictions, and developing and managing an anthropometric measurement certification program. The ARCs are promulgated in the NAVAIRINST 3710.9E and NAVAIR M-3710.1. The spreadsheets of the NAVAIR M-3710.1 Appendix C-E are included along with all above mentioned instructions. The Appendices are almost unreadable in the instruction, therefore the spreadsheets are necessary to interpret the information.

Categories of ARCs include Nude body weight (lbs.), Sitting Eye Height (SEH), Thumb Tip Reach (TTR), Buttock-to-Knee Length (BKL), and Sitting Height (SH). As per Appendix A of the NAVAIR M-3710.1 individuals must be 103-245 lbs., 26-31.5 inches SEH, 26-31.5 inches TTR, 20.4-29 inches BKL, and 31-41 inches SH.

All Navy and Marine Corps aircraft were reevaluated using updated cockpit mapping technologies as explained in NAVAIR M-3710.1 pg. 3-1. The instruction was released in Feb 2017 delineating the new ARCs based on the updated remapping.

RFI Question:

8c: Approximately what percentage of Service members were disqualified from flight status based on these requirements? Provide breakdown by gender.

RFI Response:

In 2019 at the Naval Aviation Schools Command (NASC), which is the entry point for all flight training, there were over 4500 Anthropometric Evaluations conducted for Aviation Applicants/Students, 82.9% of which were males, and 17.1% were females. Of the total applicant population, 2.8% of the females were found to be "NO GO" for Aviation due to Anthropometrics while the male NO GO rate was 2.6%.

RFI Question:

8d: What are the anthropomorphic measurement requirements for each aviation platform and why?

RFI Response:

The anthropomorphic measurement requirements for each aviation platform are found in NAVAIR M-3710.9, which is included as enclosure (1). The current instruction is dated 2017. The measurements are based on requirements to safely operate the aircraft as well as a guide to avoid assigning anthropometrically incompatible crewmembers to an aircraft (which can be both costly and potentially catastrophic).

RFI Question:

8e: What are the anthropomorphic measurements around which flight equipment is procured?

RFI Response:

Flight Students are checked and fitted for flight equipment upon check in to the Primary squadron. Flight equipment is procured based upon the student measurements and historical usage.

RFI Question:

8f: What is the process to procure sizes of flight equipment not in a squadron's inventory? How long does the process take?

RFI Response:

If aircrew cannot fit in the standard sizes of flight suits, PCU-78 Harness, Flight Boots, and Flight Gloves per (NAVAIR 00-35QH-2), they get measured per NAVAIR 13-1-6.7-2 Chapter 7 and that is sent to China Lake for manufacture. This can take up to 90 days to procure, but the recent trend has been 5-6 months.

RFI Question:

8g: What is the process to procure uniquely sized flight equipment not in standard issue?

RFI Response:

An officer who has an issue fitting into available flight equipment is referred to the Aeronautical Medical Safety Officer (AMSO)/ Flight Physiological Officer for tracking, and then referred to NAWC China Lake, CA for custom fit equipment.

A majority of flight equipment can be custom fit if the standard sizes do not accommodate an individual. In the event the PRs are unable to get a suitable fit the Aeromedical Safety Officer

(AMSO) or a member of the FAILSAFE (Fleet Air Introduction and Liaison of Survival Aircrew Flight Equipment) Tiger Team can conduct a custom fit for the ill-fitting gear.

Flight Clothing

Custom fit procedures for flight clothing are located in the NAVIAR 13-1-6.7-2 Aircrew Personal Protective Equipment (Clothing) maintenance manual, pages 7-1 – 7-18. This includes boots, flight suits, and gloves.

Helmets

Custom fit helmets are also available if a suitable fit is not achieved with standard sized helmets. Information on guidance for custom fit helmets is located in NAVAIR 13-1-6.7-3 maintenance manual pages 003 01 for Rotary Wing helmets

NOTE: If an acceptable fit cannot be found, a FAILSAFE maintenance representative shall be contacted for assistance. If the FAILSAFE maintenance representative is unable to get an acceptable fit with any size, a custom fit helmet may be procured through Gentex, or an HGU-56/P may be procured and used. Maintenance information for the HGU-56/P may be found on NATEC web-site listed under the 13-1-6.7-3-1. Also, maintenance manual TM 1-8415-216-12&P may be obtained through the US Army at Redstone Arsenal if desired. If an HGU-56/P is determined to be the only way to achieve an acceptable fit, the Aircrewman will then be limited in his or her flight capabilities. For example, a person assigned an HGU-56/P cannot use this assembly in a fixed wing instructor environment.

NAVAIR 13-1-6.7-3 007 01 for Tacair and Fixed Wing helmets.

NOTE: If an acceptable fit cannot be found, a FAILSAFE maintenance representative shall be contacted for assistance. If the FAILSAFE maintenance representative is unable to get an acceptable fit with any size, a custom fit helmet may be procured through Gentex. Fitting of the custom helmet will be done by a Gentex with the approval of the FAILSAFE maintenance representative.

Harness/Vests

Harnesses can be custom fit as per NAVAIR 13-1-6.2 006 00 pg. 14. Custom fit harness available to only those aircrew who are unable to be properly fit with available stock sizes. Two harnesses are used predominately in the US Navy, PCU-56/P Series and the PCU-78 series. The PCU-78 is an integrated harness and survival vest. The survival vest portion of the PCU-78 series is not adjustable. The harness is adjustable and can be custom fit.

The CMU-33 vest which fits over the PCU-56 harness can be adjusted to accommodate varying body types.

G-Suits

G-suits CANNOT be custom fit.

Office Responsible: Commander, Naval Air Forces (CNAF N01D)