C-17 Replacement HUD: Accommodation Comparison to Legacy HUD

Jeff Hudson[1,2], Jen Whitestone[3,1], Ron Richardson[3,1], Sarah Hollis[1]
[1]Human Systems Division Airmen Accommodation Laboratory (AFLCMC/WNU), WPAFB, OH
[2]STI-TEC, Dayton, OH
[3]Crew Systems Engineering and HSI Enterprise Branch (AFLCMC/EZFC), WPAFB, OH

INTRODUCTION:

In 2015, at the request of the C-17 program office, members of the current Airmen Accommodation Lab (AFLCMC/WNU) evaluated the anthropometric accommodation of the pilot station in the C-17 at Edwards AFB, emphasizing potential impact of the Legacy Heads Up Display (LHUD). LHUD Results were overlaid on Boeing supplied CAD geometry. However, not until this year were we finally able to collect data on a C-17 with an installed Replacement HUD (RHUD) at Wright Patterson AFB and quantify the impact to accommodation.

METHODS:

On both the LHUD and RHUD equipped C-17 flight decks, the geometry of the cockpit instrument panels, controls, seat adjustment, and HUDs were reverse engineered, by scanning with a FARO arm laser. The boundary in which pupils must be located to see 100% of the HUD symbology was defined as well. Body posture and position in the cockpit of 15 various sized test participants (four were pilots) were collected in multiple seat positions to quantify their simultaneous accommodation on rudder and yoke authority, reach to controls, clearance, and visibility over the nose, and ability to see HUD symbology.

RESULTS AND DISCUSSION:

The LHUD and RHUD impact to pilot eye position was calculated. At Edwards, the four pilots were asked to set up their seat where they fly when using the LHUD, and at a hypothetical position with no LHUD installation. For the latter, all four moved their seat (up to 3") aft of the LHUD 100% symbology volume. This was done to increase their leg clearance with the main instrument panel. Recent data collection with the RHUD allows us to quantify its impact.