

**An Empirical Approach to UAS Crewmember Medical Certification. *Tvaryanas, A; USAF Performance Enhancement Directorate.***

**Background:** The issue of medical standards for individuals participating solely in unmanned aviation is a hotly debated topic. There currently are no uniform standards across the military services, nor are there formal civil standards for the aeromedical certification of unmanned aircraft system (UAS) pilots. While various organizations are developing recommendations for standards, there have been very few studies addressing medical standards based on an empirical analysis of the UAS pilot task environment. Some have argued that controlling one or more unmanned aircraft (UA) is more akin to air traffic control (ATC), and thus medical standards for ATC specialists (ATCS) are appropriate. This argument misses the critical distinction that UAS operations involve much more than simply monitoring and controlling one or more aircraft. Others believe existing manned flying medical standards are appropriate for unmanned aviation. However, UAS operations are not the same as manned aviation because the pilot and the aircraft are not co-located, thereby eliminating potential exposures to many of the traditional aeromedical physical hazards.

**Rationale:** This study was undertaken to establish recommendations for aeromedical certification standards for pilots controlling large or weaponized UASs.

**Methods:** This study employed a task analysis of MQ-1 Predator, MQ-9 Reaper, and RQ-4 Global Hawk UAS pilots to establish the type of work performed by UAS pilots and the contextual work conditions (e.g., ground control station (GCS) human-machine interface, operational tempo, shift work, etc.). Subsequently, a panel of aerospace medicine subject matter experts at the USAF's Aeromedical Consultation Service representing various subdisciplines of medicine developed recommendations for UAS pilot medical standards. Issues considered by the panel included the physical demands of the present and anticipated future GCS environments and the likelihood for medical conditions to predispose to incapacitation or cause undue distraction or performance degradation.

**Results:** There was unanimous agreement among USAF aerospace medicine experts that current standards for manned aircraft flying duties are unnecessarily restrictive when applied to the unmanned aircraft domain. Although many of the job essential tasks of the UAS pilot and manned aircraft pilot are the same, the work environments in which these tasks must be executed fundamentally differ. An equally significant finding was that the medical standards for ATCS are lacking when applied to pilots of large or weaponized UASs. In this case, although there are similarities in the work environments, the job essential tasks are very different. Additionally, concerns regarding the potential for subtle decrements in performance, distraction, or sudden incapacitation are more significant for the UAS pilot vice the ATCS. The recommended medical standards for UAS pilots place increased emphasis on visual, cardiac, neurological, and psychiatric factors relative to the medical standards for ground-based controller duties.

**Conclusion:** The methodology employed in the present study offers a significant advantage over other, less empirical approaches to establishing UAS pilot medical standards. The overall analysis suggests that a separate set of distinct medical standards should be created for career UAS pilots flying large or weaponized UASs.