Unmanned Aircraft System (UAS) Operations Tempo and Human Factors Accident Rates

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ABSTRACT

Recently the U.S. Army unmanned aerial systems (UAS) military operations have increased at a dramatic rate. From 2001 to 2006, the operations tempo of one unmanned system in the U.S. Army had increased by a factor of over 10 times, while corresponding increases in other government service's use of UASs had also increased dramatically. These increases in operational tasking have resulted in increased accident rates for those systems from both mechanical and human factors causes. A recent accident analysis of these events for a particular U.S. Army UAS showed dramatic increases in the number of accidents that have occurred. The focus of that study was on the human factors elements of UAS accidents, and an examination of causality of those accidents. Data for this accident analysis was collected from several sources including the Army's Combat Readiness (Safety) Center, and UAS Program Manager's accident databases, as well as field interviews and questionnaires. Numerous variables of interest were studied, and those included assessments of manning levels, accidents as a function of flight hours, and the use of the Human Factors Accident Analysis and Classification System (HFACS) taxonomy. The use of a taxonomy for this particular UAS system complimented work done by other researchers who have investigated accidents across Army UAS systems using the same taxonomy. In particular, this HFACS approach allocated proportions of causation to not only individuals involved with the accident but to supervision, management, and training. It is recommended that a taxonomy of this type be considered to provide a broad spectrum view of accident causality, and indirectly to assess how pervasive human factors are in accident causation. A central premise of this accident study was to posit that considerably more attribution of accident causality should be made toward the human part of any system involved in an accident. However, rather than providing a single point explanation that the accident was caused by a somewhat ill-defined human error, this study's approach provided a pathway to recommend specific design, manufacturing, or maintenance related changes. Notable variables included: specific modeling of operational tempo effects, design changes, and workload reducing strategies. Relating the broad classification methods of the HFACS to system specific changes, the cause and effect nature of an accident can be better examined and an assessment of causal factors can be more vigorously defined and addressed. In summary, this study proposed the use of an existing taxonometric error classification system, but suggests that the use of that system can only be effective in reducing further accidents by tying its conclusions into a theoretic framework which posits that human actions or inactions are the primary causal factor in accidents. It also suggests that far from being enigmatic or difficult to assess, these human related causal factors can be addressed to reduce overall system error, perhaps reducing overall system error dramatically.