

UNMANNED AIRCRAFT SYSTEM (UAS) HUMAN SYSTEM INTEGRATION: THE U.S. AIR FORCE EXPERIENCE

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Background: As a result of successes with UASs in recent military operations in the Balkans, Afghanistan, and Iraq, the U.S. military services have invested in programs to expand the role of UASs within their operations. Demands on unmanned aircraft system (UAS) operators are increasing due to a variety of factors including technological advances, the emergence of new missions and concepts of operations (CONOPS), increased volume and complexity of information, and continuing pressure to maintain or reduce manpower levels. Because of these transformational factors, the Air Force is continuously challenged to adequately address human systems integration (HSI) in order to optimize UAS operator performance.

Rationale: Human performance is a function of the quality of the inputs provided in the 7 domains of HSI which include human factors, personnel, training, manpower, environmental safety and occupational health, habitability, and survivability. Currently Air Force UAS operator performance is being impacted by activities involving the human factors, personnel, training, manpower, and safety and occupational health domains.

Discussion: This presentation describes the Department of Defense (DoD) HSI model, identifies latent failures existing within HSI domains, and predicts the impact on USAF UAS operator performance, reviewing existing empirical data where available. Specific areas of interest include: 1) changes to UAS operator personnel selection, training, and aeromedical certification criteria resulting from the development of a new career field for non-pilot UAS operators, 2) human factor engineering deficiencies in current UAS ground control station (GCS) design and their impact on human error, 3) human performance considerations pertaining to the new MQ-1 Predator multi-aircraft control (MAC) GCS, 4) the impact of rotational shift work during a period of sustained combat support operations on UAS operator fatigue, mood, alertness, cognition, and piloting performance, 5) assessments of task-related boredom in the highly automated GCS environment, and 6) correlations between fatigue and UAS operator flying hour histories

Application: HSI implementation tends to be stronger within the traditional areas of human factors emphasis such as cockpit design. Although there are certainly significant shortfalls in current UAS GCS design, there is an equally urgent need to implement good practices in the other HSI domains in order to enable rather than degrade UAS operator performance.