# Decision Making and Human Error for Predator: the 21st Century Warriors

The use of unmanned air vehicles (UAVs) in military operations is expanding rapidly. This trend will likely continue given recent DoD action to increase funding for UAV development from $3 billion in the 1990s to over $12 billion for 2004-2009. High UAV mishap rates generated multiple reviews of unmanned operations in the past few years, but even within common platforms, different analysts attributed these trends to differing causes. Air Force Predator Class A mishap reports from 1996-2006 were reviewed to identify trends. Mishap rates dropped substantially, with the rate across the last three years being about one third the rate across earlier years. Mishap *counts*, however, are increasing due to the rapid expansion of Predator operations. First-half/second half comparisons (1996-2003/2004-2006) reflect substantial changes in causal factors over time. Early mishaps often involved power plant and other mechanical issues. Human error in the early mishaps tended to reflect operator station design and fatigue/workload issues, but these issues were much less frequently cited in the last few years. As unmanned vehicles become the weapon of choice for intelligence gathering, surveillance monitoring reconnaissance and munitions employment, it is important to identify leading influential factors that negatively impact their successful mission effectiveness, performance and use. Operator error has been frequently cited in Predator Class A mishaps throughout the history of the system. These vehicles are being controlled remotely from, at times, thousands of miles away by a pilot who only receives cryptic visual cues and tabular data on the attitude and performance of the vehicle. Major differences between manned and unmanned vehicles reside in the fact that in manned aircraft, the pilot receives immediate feedback through a number of perceptual senses while piloting the craft while being completely immersed in the environment. The pilot of the unmanned aircraft must utilize the computer interface and place full confidence in an extremely foreign environment of remote cameras and monitors for sensory feedback, personal experience, and training to make piloting decisions. Mishaps over the most recent three year period were predominantly linked with operator error (83%). Mishap reports in recent years most often cited skill, knowledge (checklist error, task misprioritization and system knowledge), situation awareness (channelized attention), and team coordination shortfalls. Additional research will be critical to assessing the attributes that appear to be the major contributors to the high number of UAV losses in a period characterized by a rapidly growing crew force with decreasing experience levels. These new data highlight the need to revise Predator training for both individual and team skills and consider alternative training approaches that focus on the practice and improvement of these key human factors skills. Our focus in this paper will be on identifying the key human factors attributes that impact Predator crew decision making, coordination and situation awareness based on specific mishap human factors trends, and exploring alternative instructional methods to satisfy these objectives for the quickly expanding crew force.