

Sustained Attention: A Human Factors Problem

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Sustained attention or vigilance refers to the ability of operators to maintain their focus of attention and detect target stimuli over prolonged periods of time. This ability is a crucial component in work environments where automated systems are involved such as military surveillance, air traffic control, airport baggage inspection, border security, industrial process and quality control, and the monitoring of medical systems. At first glance, the task of acting as a system supervisor who observes instrument displays and must take action only when problems arise would seem to be a modest work assignment. However, research has shown that the need to remain vigilant reflects two basic elements in human engineering. Namely, the human operator is often the weakest link in human-machine systems and what initially appears to be a simple problem is really quite complex. Studies have shown that sustained attention is fragile, waning quickly over time, a phenomenon termed the vigilance decrement. Moreover, performance efficiency in vigilance assignments is determined by a variety of stimulus factors, such as the sensory modality of signals, their probability of occurrence, and the flow of non-signal events in which they are embedded, as well as by environmental factors such as noise and temperature. In addition, vigilance assignments induce a substantial amount of workload and stress in operators and the neural systems in control of vigilance have been found to involve several areas of the brain and changes in cerebral bloodflow velocity. Clearly, operator vigilance is a complex component of automated systems.