



## Spatial Disorientation in Flight – A Multi-Dimensional Problem Needing Multi-Faceted Solutions

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### Abstract:

During peace time, the most life threatening aeromedical problems that the air force might encounter are spatial disorientation (SD), G induced loss of consciousness (G-LOC) and to a lesser extent, hypoxia. SD is defined as the failure to perceive, or to perceive incorrectly the position, motion and attitude of the aircraft or oneself within the veridical vertical and the earth horizontal reference. The mechanism of spatial orientation is based on the neural integration of concordant and redundant visual, vestibular and somatosensory inputs and critical interpretation with our internal model established from past experience and training. Unlike G-induced loss of consciousness or hypoxia, SD occurs in less well-defined environments and it is influenced by physiological and perceptual limitations. Assessment of the role played by SD in any mishap may have to rely on circumstantial evidence and is always open to investigator bias. Mishap analysis often reveals multiple causal factors leading to the final event. New flight display technologies might also contribute to SD susceptibility. The complexity of SD in the flight environment demands a “wide-angle” holistic approach. Examples will be provided in this presentation to demonstrate the necessity of a coordinated effort from operators, scientists, engineers and research sponsors to lessen the impact of SD on flight safety.