Comparison of Pilot Scan Patterns during Unusual Attitude Recovery in Glass versus Analogue Cockpits

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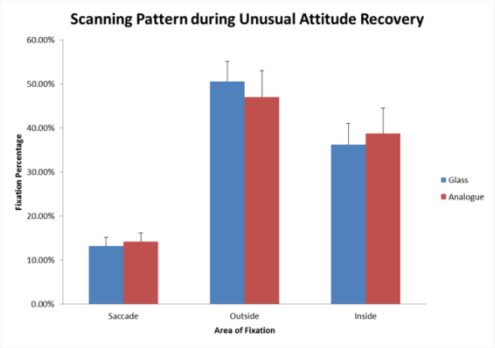
Introduction: Proper scan pattern is a vital skill for pilots to learn and master. This is particularly essential when flying in an abnormal situation, such as recovering from an unusual attitude (UA). Achieving and maintaining scan patterns is further challenged during recovery when flying in an aircraft with different instrument display and information layout, such as a 'glass cockpit' or an 'analogue cockpit'. The aim of this study was to determine if pilot scan patterns were different in an analogue cockpit compared to a glass cockpit during UA recovery.



Methods: Twelve fixed-wing pilots, 9 male and 3 female, participated in this study. The study received institutional ethics approval and was conducted in a reconfigurable fixed-wing flight simulator. Each pilot encountered the scenario twice, once in a glass cockpit and once in an analogue cockpit. The aircraft was placed in a 35^0 nose-up pitch and 10^o bank to the right at 5,000 feet above sea level. The pilot, unaware of the UA, had to take control of the aircraft and recover immediately. Objective data was collected using a head-mounted eye tracker. Fixation time was expressed as a percentage of the total recovery time.

Results: Pilots scanned the outside world 7.53% more in a glass cockpit than an analogue cockpit. The outside world scan patterns were not significantly different between a glass and an analogue cockpit. The inside instruments were scanned 6.82% more in an analogue cockpit than a glass cockpit. The inside instruments scan patterns was not significantly different between a glass and an analogue cockpit. The saccade rate of the subjects was 8.15% more in an analogue cockpit than a glass cockpit. The saccade rate was not significantly different between a glass and an analogue cockpit.

Discussion: The results of this study show that there was no significant difference in pilot scan patterns between glass and analogue cockpits during unusual attitude recovery. This is in contrast to previous studies that show a difference in scan patterns between the two types of cockpits in normal flying conditions. The severity and the time-critical nature of the UA situation forces pilots to have similar scan patterns during recovery, despite the type of cockpit. The results of this study help to further our understanding of visual scanning and information acquisition by pilots during critical stages of flight. This study is part of a bigger project investigating pilot scan patterns in different types of cockpits.

Disclosure Information (Aerospace Medical Association 88th Annual Scientific Meeting): I have no financial relationships to disclose. I will not discuss off-label use and/or investigational use in my presentation.