

## **“Effects of Fatigue on Threat and Error Management Behavior of Long-Haul Flight Crew”**

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### ***Abstract***

Fatigue is associated with many forms of performance degradation, and laboratory studies have demonstrated impairment on performance measures such as vigilance, reaction time, and short-term memory. While the results of these studies are then typically generalized to real world behavior, the extent to which the outcomes of these experiments reflect the effects of fatigue on the performance of actual work tasks is not known. Specifically, relatively little is known about the effects of fatigue on the operational performance of a crew, within the complex domain of long-haul flight operations.

This study investigated the effects of fatigue on the operational performance of international long-haul flight crew. A total of 67 crew participated in the study after either completing a long-haul flight pattern (non-rested), or after having at least four consecutive days free of duty (rested). The study utilized trained expert observers to analyze and evaluate crews' threat and error management behaviors and decision-making performance during a simulated flight operation. The simulator scenario was designed to present crews with a “normal” flight operation, which included a series of operational threats designed to provide additional workload for the crews, yet not extend outside the parameters of normal flight operations.

The results of this study highlight the effect of fatigue, both in terms of the “fatigue-proofing” strategies used by crew to protect performance, and also the negative impacts of fatigue on operational performance. The results of the study highlight the impacts of fatigue on decision-making performance, and also the shifts in error profile and error management behaviors observed to be associated with fatigue.

### ***Main Points***

- Relatively little is known about the subtle effects of fatigue on the performance of flight crew during normal long haul flight operations
- This study examined the fatigue-related changes in threat and error management, and decision-making behavior of long haul flight crew

A copy of Dr. Matthew Thomas' biographical information and presentation slides are provided in Appendix B.