

# Real-Time Predictive Estimation of Loss-of-Control Events on Transport Aircraft

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Loss-of-Control events are the most significant contributing factor to accidents amongst commercial aircraft, and systems capable of warning pilots of impending entry into a control-loss event are crucial. To this extent, three look-ahead prediction architectures are designed to predict, in real-time, an aircraft's tendency to cross its control-loss boundaries. The algorithms continuously calculate the amount of control authority required to reach and exceed these boundaries over the course of a predefined future time period. These calculated control authority limits are visually presented to the pilot on an accompanying display, providing rapid alerts when impending entry into a control-loss event is predicted to occur in the upcoming several seconds. Validation of the algorithm's effectiveness is performed on the NASA Generic Transport Model, and the algorithm is successfully able to predict, at any given time, if the pilot's current input causes control-loss at 2 and 5 seconds in the future.