Aerospace Engineering Thesis Defense

The Doghouse Plot: History, Construction Techniques, and Application

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abstract

The Doghouse plot visually represents an aircraft's performance during combined turn-climb maneuvers. The Doghouse plot completely describes the turn-climb capability of an aircraft; a single plot demonstrates the relationship between climb performance, turn rate, turn radius, stall margin, and bank angle. Using NASA legacy codes, EDET and NPSS, we can reverse engineer sufficient basis data for commercial and military aircraft to construct Doghouse plots. Engineers and operators can then use these to assess their aircraft's full performance envelope. The insight gained from these plots can broaden the understanding of an aircraft's performance and, in turn, broaden the operational scope of some aircraft that would otherwise be limited by the simplifications found in their Airplane Flight Manuals. More importantly, these plots can build on the current standards of obstacle avoidance and expose risks in operation.

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