CONCEPTUAL DESIGN OF THE G2 THUNDER SKUNK

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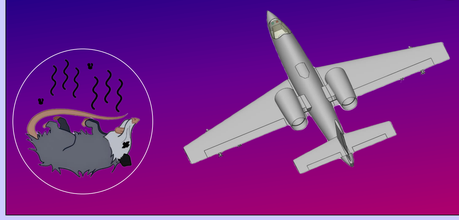
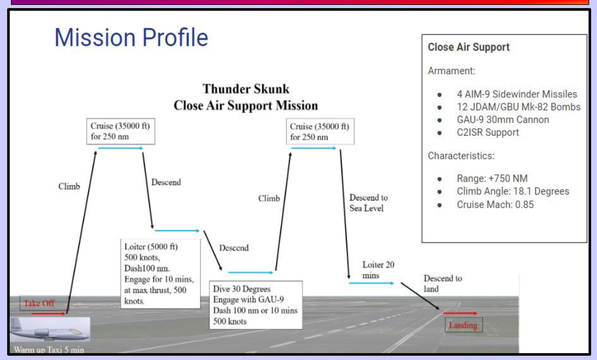
San Diego State University

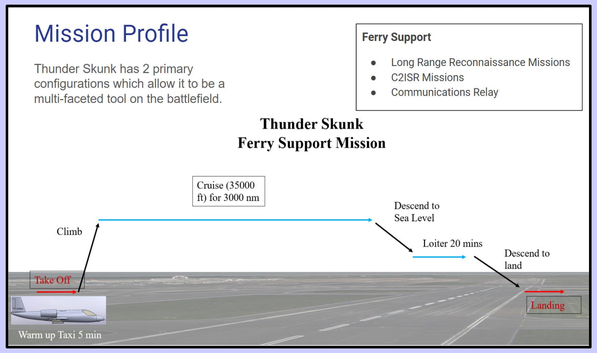


PROJECT OBJECTIVE

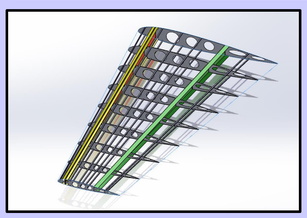
This project encompasses the theoretical design of a Close Air Support (CAS) aircraft. The G2 Thunder Skunk was created and iterated over the course of nine months to satisfy the United States Air Force's System Requirements Document (SRD), which outlines the performance requirements of CAS aircraft. The analysis conducted on each iteration considered six different configurations that are commonly used in wartime missions.

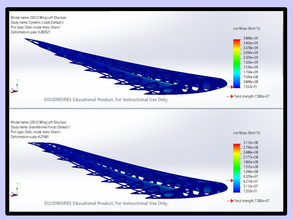
MISSION PROFILE

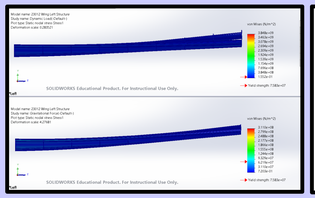


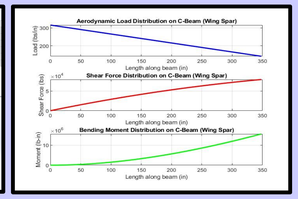


STRUCTURES

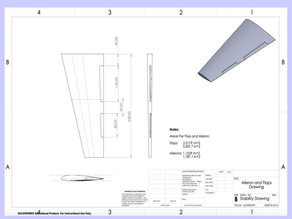


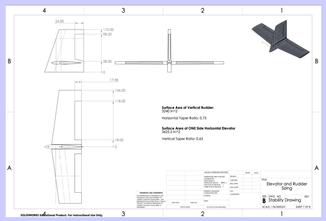




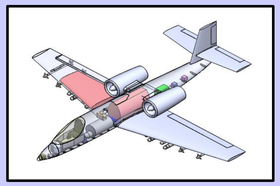


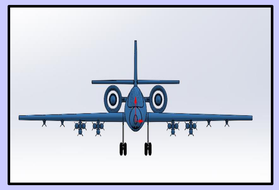
CONTROL SURFACES

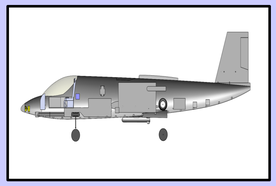


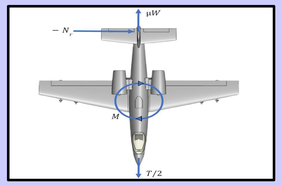


SOLIDWORKS MODEL

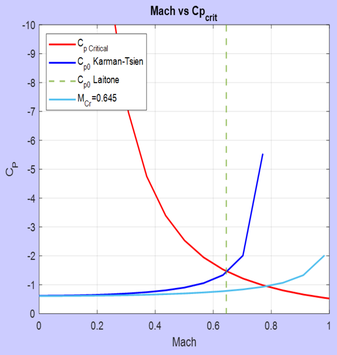


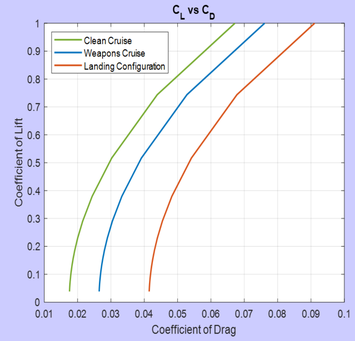






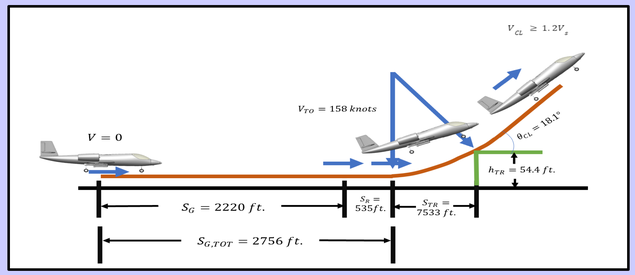
AERODYNAMIC CHARACTERISTICS



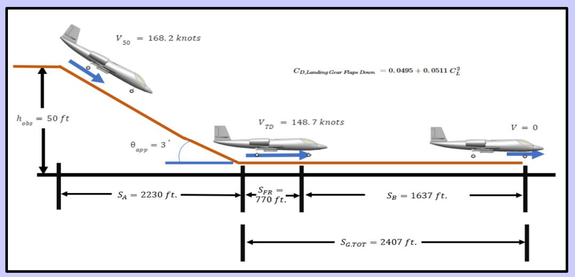


PERFORMANCE CHARACTERISTICS

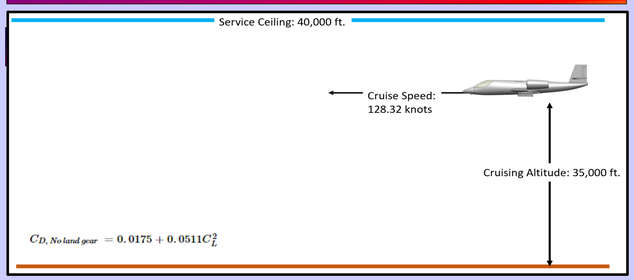
TAKEOFF PROFILE



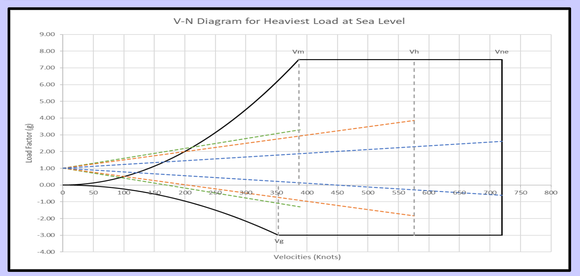
LANDING PROFILE



OPERATING CONDITIONS

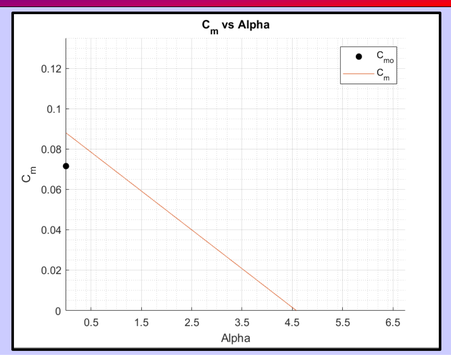


V-N DIAGRAM



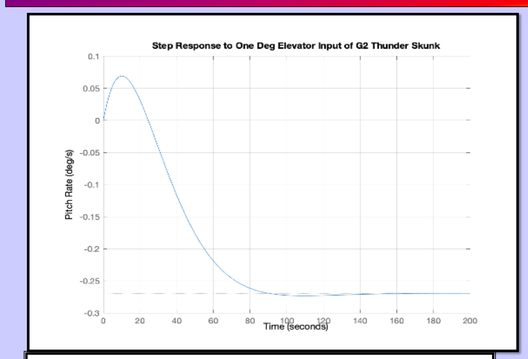
STABILITY CHARACTERISTICS

LONGITUDINAL STATIC STABILITY



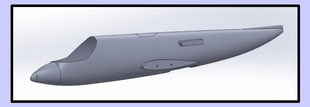
The flight condition for stability was for M =0.7 at 40,000 feet. G-2 Thunder skunk is stable longitudinally as shown by the negative slope from the plot above. The aircraft has zero-lift pitching moment coefficient (Cmo) of 0.07153 per deg and a trim angle of 4.5 degrees.

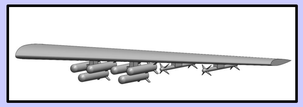
LONGTUDINAL DYNAMIC STABILITY

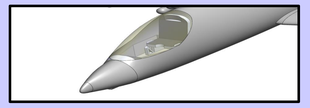


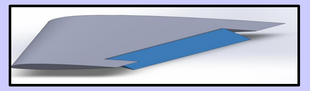
The Step Response to a 1-degree elevator input reflects the high damping of the short period mode. SAS systems are considered to improve this response.

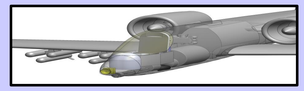
DESIGN EVOLUTION

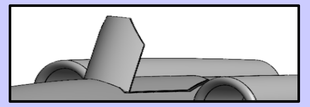


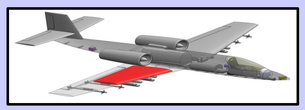


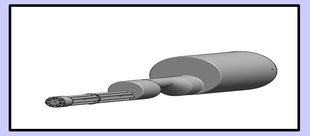


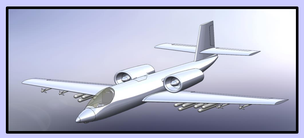












REFERENCES

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[2] Butler, G (Revision Fall 2023 REV D 8/19/23) AE460 A/B REPORT CONTENT REQUIREMENTS

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