

Georgia Institute of Technology
Aerospace Systems Design Laboratory

Low Noise Subsonic Transport: Hybrid Wing Body

NASA University Design Challenge

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Abstract

This study recommends a hybrid wing body vehicle with two geared turbofan engines along with key technologies as a candidate for meeting NASA's mid-term goals. An Integrated Design Environment was used to perform multi-disciplinary analysis and optimization. Design of experiments and response surface methodology were used to explore the design space of a hybrid wing body configuration and produce an optimized geometry. The optimized HWB alone reached a 44% reduction in fuel burn, a 76% reduction in LTO NO_x, a 52 dB reduction in aircraft noise and a 60% reduction in cruise NO_x. The TIES methodology is recommended to explore the benefits of 13 selected technologies and push the vehicle to meet the target metrics. This design is recommended to be introduced as a cargo vehicle to improve customers' perceptions of its reliability and safety before integration into the passenger aircraft market.