

NASA Supersonic Challenge University of California - Davis

Undergraduate Level

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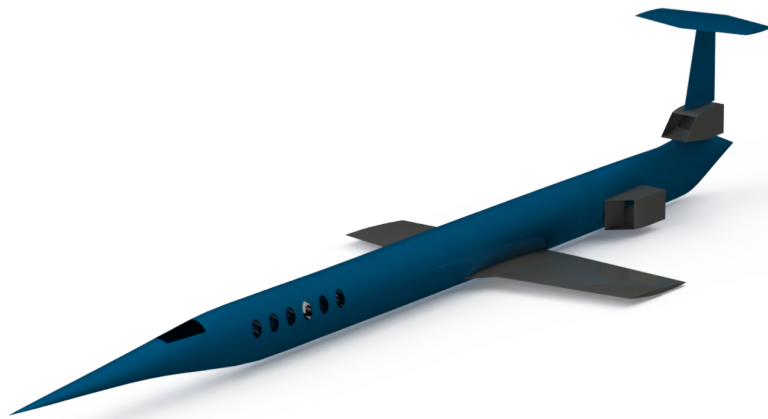
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Abstract

This paper describes the design of a commercial supersonic business jet focused on meeting the requirements specified in the 2017 NASA Advanced Air Vehicles Student competition. The design focuses on meeting the RFP limits for supersonic cruise efficiency and high-lift for take-off and landing with an initial operational capability of 2025. The proposed design, designated Emperor, is a low-wing, 3 engine aircraft capable of accommodating up to 10 passengers. The current design has a range 4,000 nautical miles cruising at Mach 1.6 with a payload of 10 passengers. Emperor has a maximum take-off weight of 86,931 lbs, an empty weight of 43,508 lbs, and a maximum payload of 2,150 lbs. Emperor requires 55,984 lbs of takeoff thrust and is powered by three TF33-P-7 turbofan engines. Emperor combines a low-boom fuselage and a supersonic leading edge to achieve high supersonic efficiency feasible for deployment by 2025.