



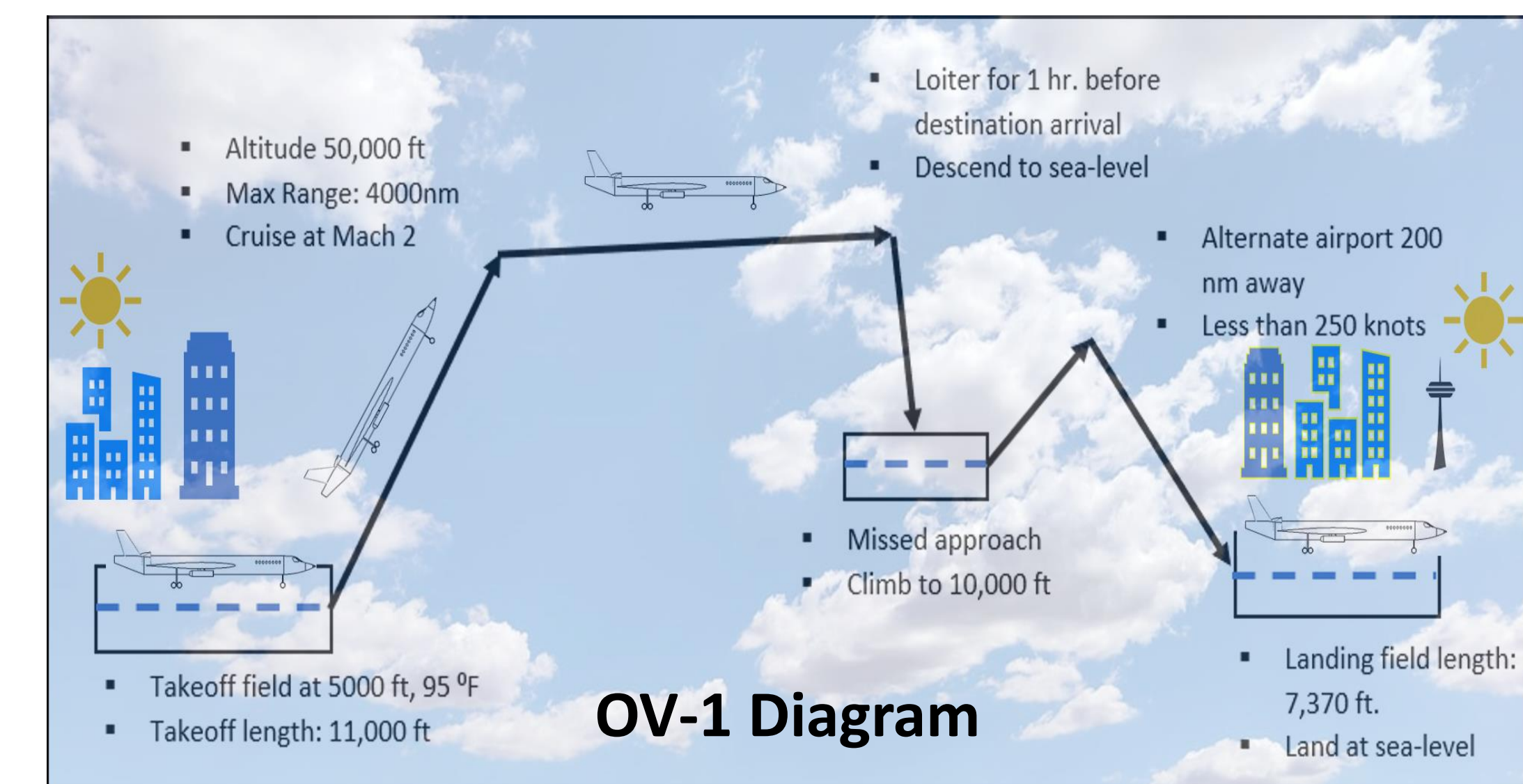
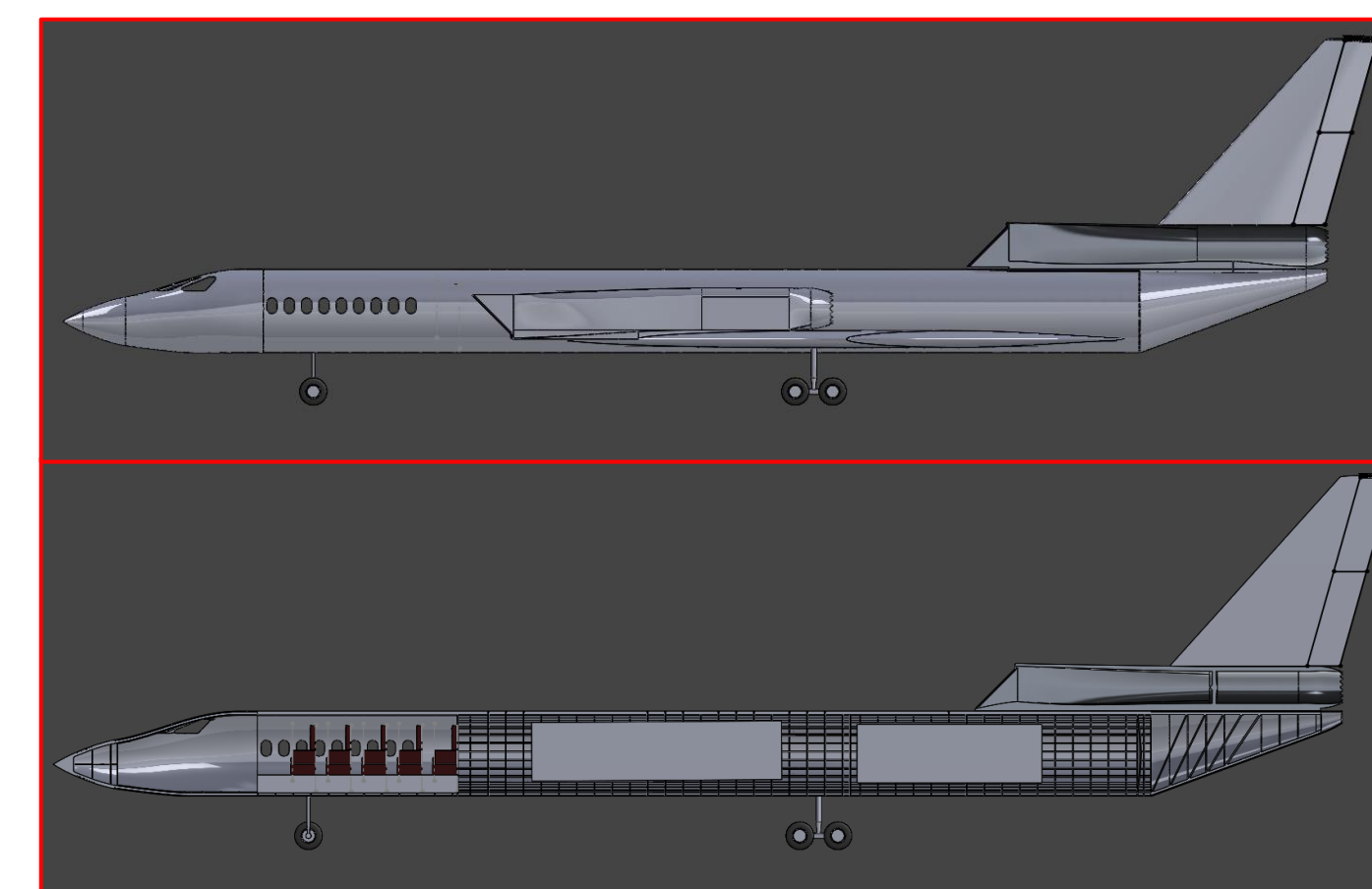
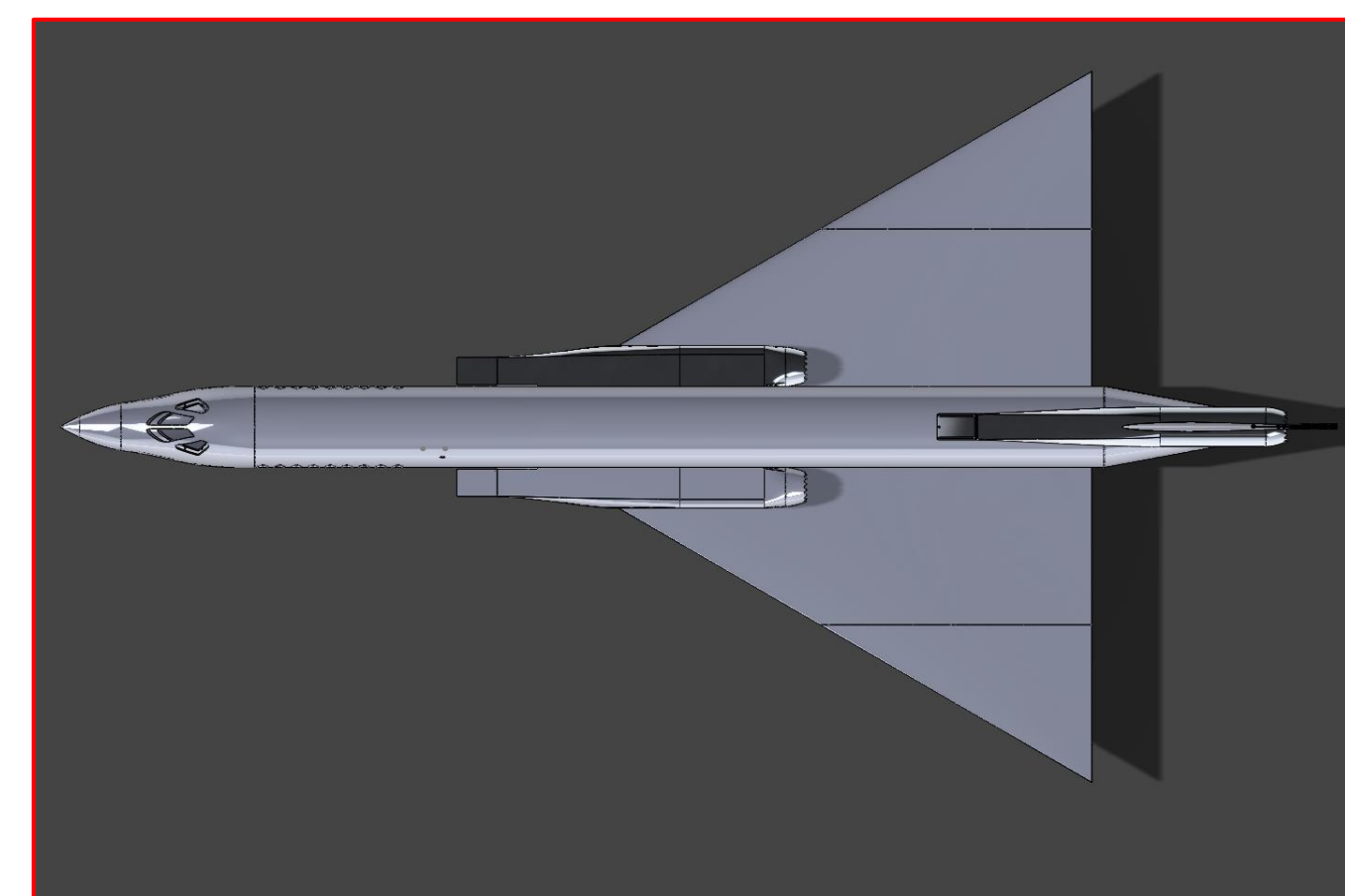
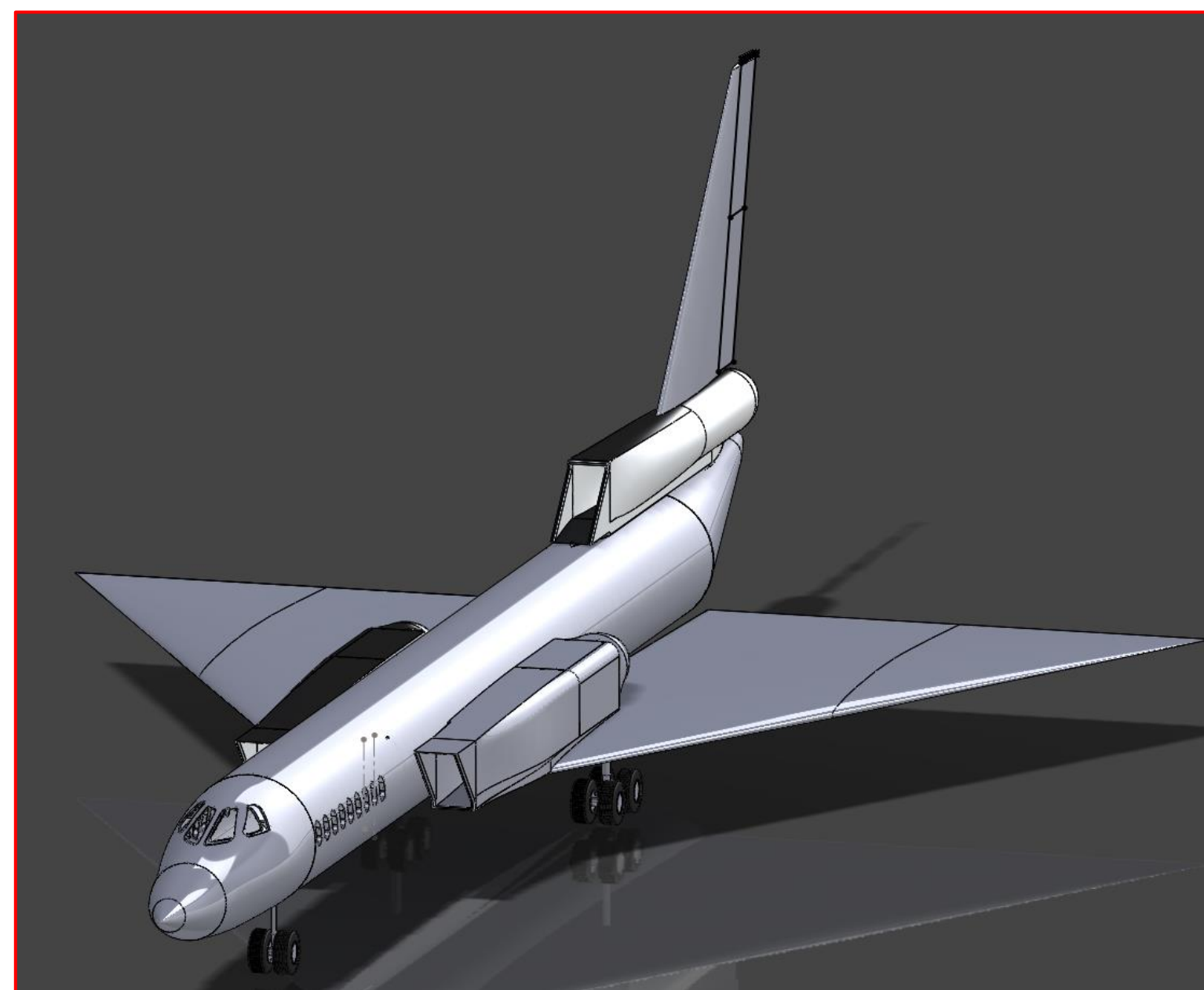
SKYBEAM

Supersonic Business Jet



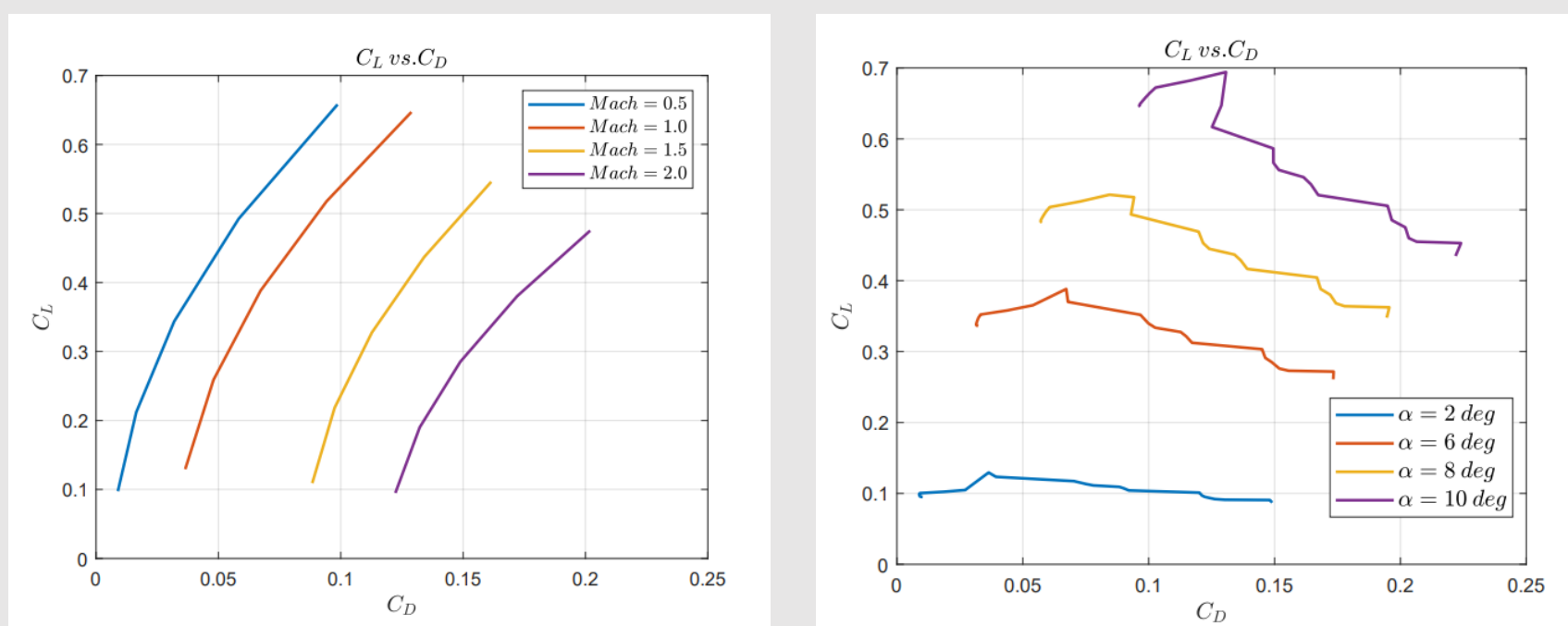
Introduction: The field of commercial supersonic flight has faced multiple challenges - noise pollution, considerable fuel requirements, and high development cost. Despite this, developments in the field of acoustics and aerodynamics have persisted, and interest in the development of a supersonic business jet has seen a revival in recent years. The Skybeam is a proposed design that addresses these issues, transiting the Atlantic Ocean in record time with an estimated total project cost under that of past attempts, such as the Concorde.

Design: The Skybeam was designed with the merits of previous large supersonic aircraft in mind, namely the Concorde, Tupolev Tu-144, and the Convair B-58. Many design decisions were driven by the performance in cruising flight, as the Skybeam is expected to hold its max speed of Mach 2.0 for multiple hours during cruise. A highly swept delta wing and elongated nose were chosen for their supersonic flight characteristics. The geometry of the fuselage was tailored to the Whitcomb Area Rule for its optimized drag in supersonic flight. Takeoff and landing requirements also influenced key design decisions, such as the three-engine layout, landing gear placement, and wing sweep.

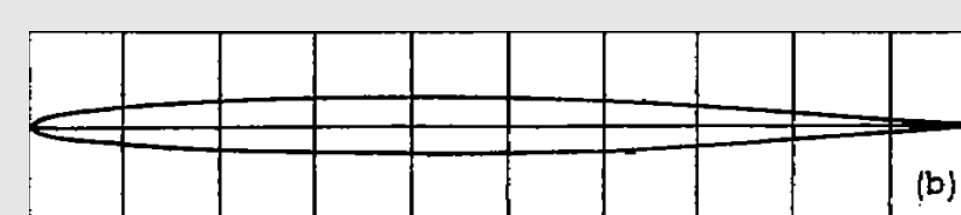


Performance: The Skybeam is designed to fly at Mach 2.0 for most of its flight. Performance estimates were calculated at a cruise altitude of 55,000 ft. Operating conditions project the Skybeam to have a range of 3150 nautical miles, capable of making the flight from New York to London with a reasonable cushion. Current commercial airliners make this flight in over 7 hours, however in the Skybeam it is projected to take less than 3. As a tradeoff the Skybeam requires quite a long runway to take off and land, limiting travel to large hub airports. While supersonic flight is restricted over land the Skybeam has made efforts to reduce noise inside and outside the cabin with an elongated nose, engine placement, and chevron nozzle design.

- Maximum Takeoff Weight:** 164,000 lbs.
- Length:** 121 ft **Height:** 9 ft, 2 in
- Wingspan:** 70 ft
- Max Speed:** Mach 2.0
- Thrust:** 20,187 lbf. (per engine)
- Crew:** 2 pilots, 1 flight attendant
- Passenger Capacity:** 18, including 50 lbs. luggage each
- Project Cost Estimate:** \$8.57 bill. **Unit Cost Estimate:** \$249 mil.

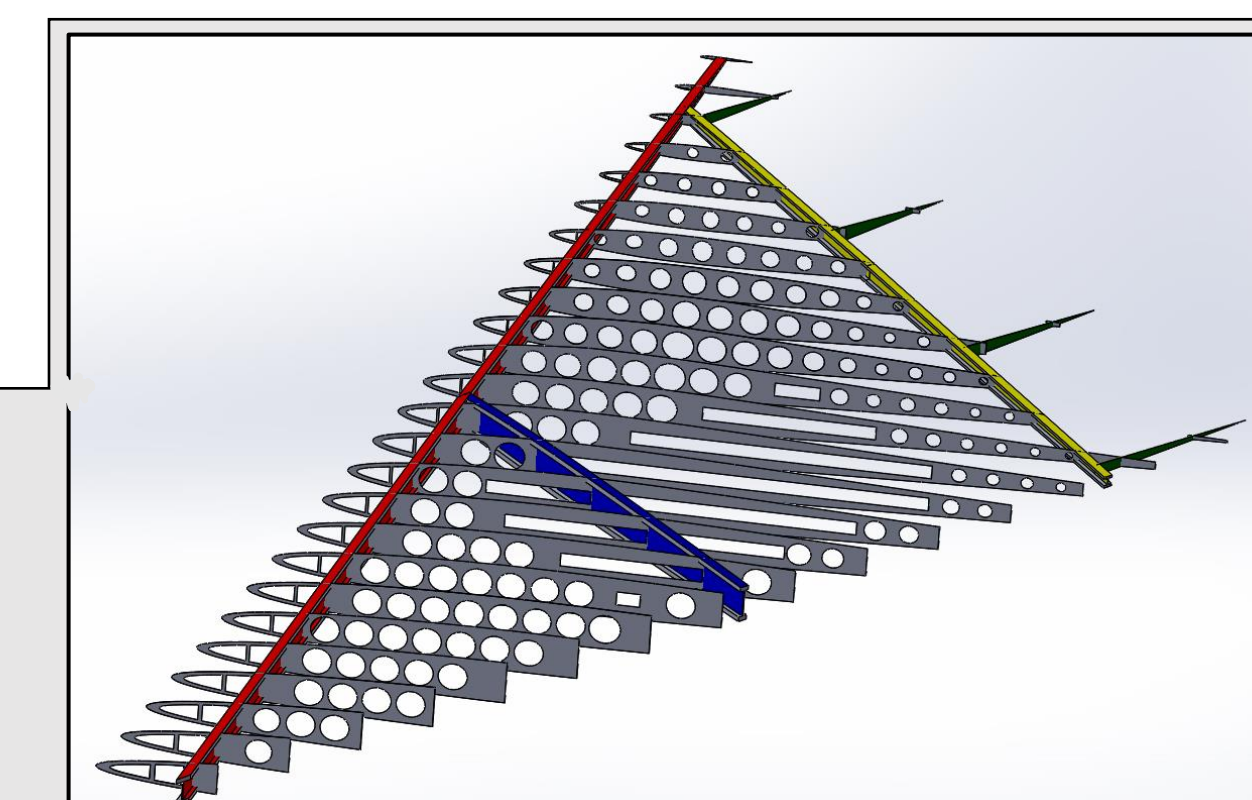
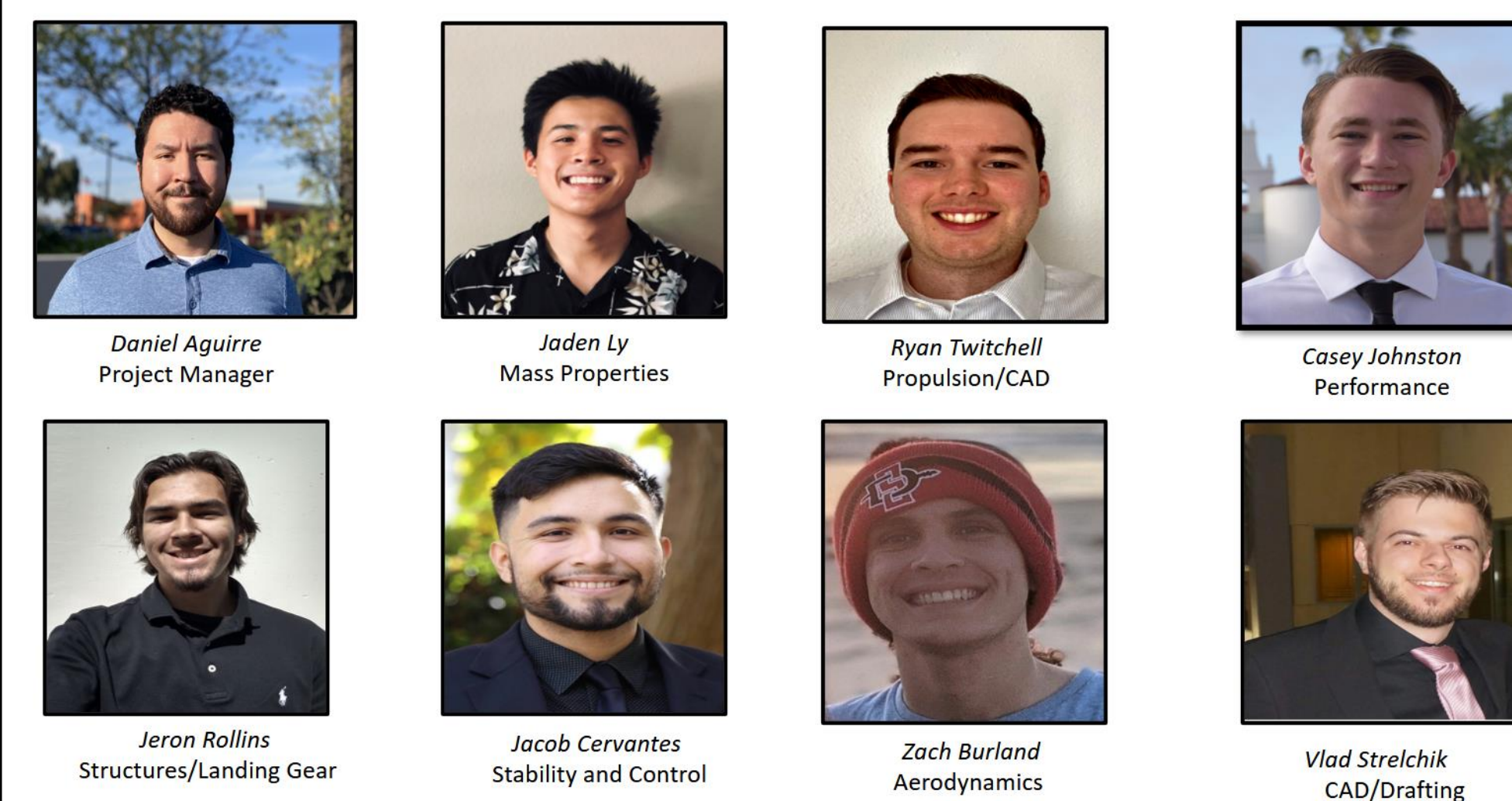


Lift and Drag data with respect to Mach number and Angle of Attack

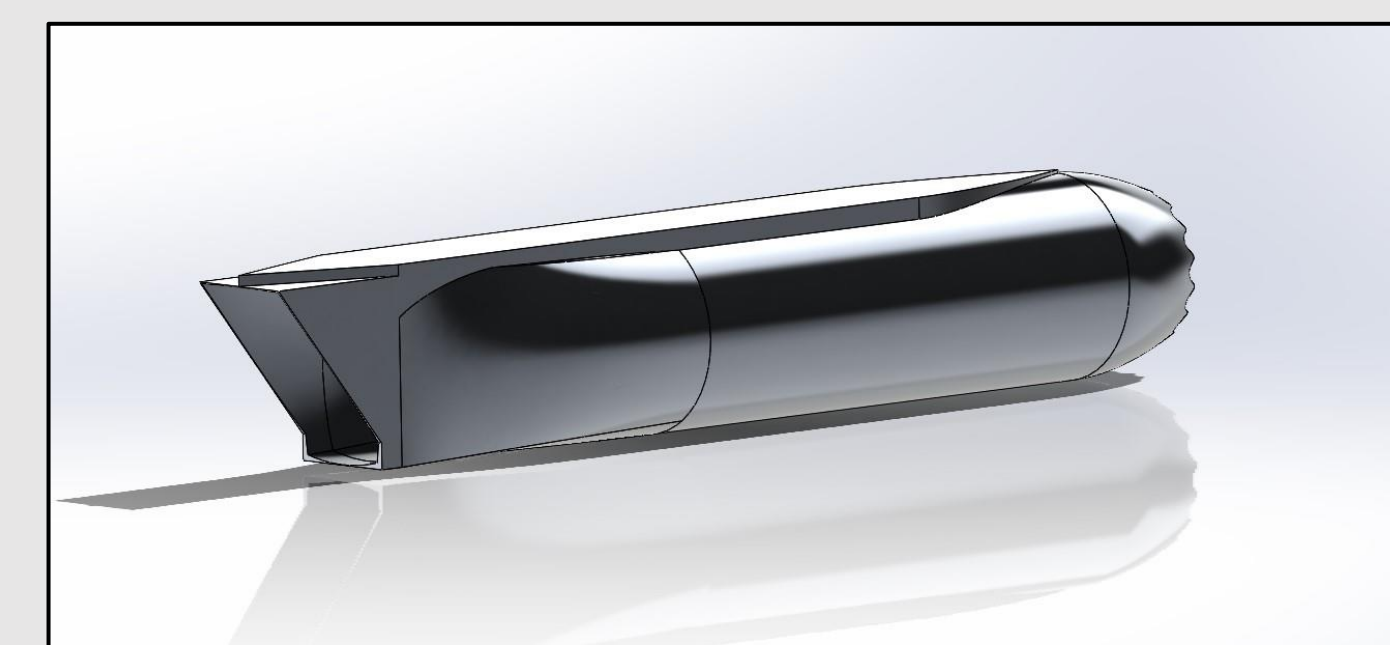


Cross-Section of the main airfoil shape used on the Skybeam's wing: NACA 64A006.

Image from Theoretical and Experimental Data for a Number of NACA 6A-Series Airfoil Sections" by Laurence K. Loftin, Jr., 1948



Wing Box Structure
Red: LE Spar
Blue: Main spar
Yellow: TE spar
Green: Control surface supports



Base Engine: F118-GE-100
 Elongated inlet for supersonic flow, chevron nozzle for noise reduction