

Aerospace Design Weekly Progress Report

Team Gamma

Week 1 - January 21, 2025

1 Progress Made

1.1 Product Breakdown Structure

- We began by forming an initial product Breakdown
- We then used this breakdown to begin researching requirements

1.2 Research Topics Summary

We began researching: - FAA Regulations on: - Runways - Hangers - Weather conditions - Stability - Safety (fire suppression and cabin dimensions) - Comparable Jets - The A380 was used for many preliminary calculations, as the largest currently operated passenger jet.

1.3 Requirements

- Since we are designing a large transport vehicle, the 14 CFR 25 (airworthiness standards for transport category airplanes) was used to determine many of the FAA requirements for the plane.
- Mission requirements were also categorized.
- Other “customer requirements” were drafted from mission requirements and regulations. These will be used to guide trade studies for the determination of design requirements.
- Requirements were drafted in the following categories:
 - Stability
 - Passenger loading
 - Weight
 - Performance
 - Operational Internal Components
 - Passenger components: Windows, seats, bathrooms, food preparation

1.4 Weight Calculations

- Crew weight was found to be ~4,818 lbs
- Payload weight was found to be ~331,660 lbs
- Total weight was found to be ~2,233,541 lbs

1.5 Additional Work

Mission diagram, project breakdown structure diagram and preliminary function block diagrams were created.

2 Next Week's Objectives

2.1 Continued Research

Next week, we aim to continue researching the above topics. Specific additional research includes: - Water Storage - Takeoff thrust determination (this will aid in specifying many engine requirements) - Taining requirements

2.2 Trade Studies

We aim to begin conducting the following trade studies: - Cabin and Seat configuration - Cruise thrust requirements - Take-off/Landing thrust requirements - Alternative fuselage designs (double fuselage, flying wing, double decker, etc.) - Wing geometry - Fuel Efficiencies