

# Week 1 Progress Report

Team Gamma

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.
- Geometry using ch. 5&6 of Raymer ## 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
  - Structure
  - Passenger loading
  - Weight
  - Performance
  - Operational Internal Components
  - Passenger components: Windows, seats, bathrooms, food preparation

### 1.3 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

### 1.4 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
- Takeoff/Landing thrust requirements
- Alternative fuselage designs (double fuselage, flying wing, double decker, etc.)
- Wing geometry
- Fuel Efficiencies
- Refine W/S and L/D to be more in line with mission parameters