*Usage of the Report Content Requirements (RCR) ensures uniformity of the design report. Where conflict exists between the System Requirements Document (SRD) and the RCR, the SRD takes precedent.*

# Executive Summary

This section is your creative sales pitch. Think of it as a detailed automotive sales brochure that makes a customer want to buy one, or at least wants to see more.

## Description

### Describe the design and why it is best for the design mission. This is the page turner section, no more than one page long. See Jane’s or on-line sources for examples.

### Present an OV-1 diagram with **key requirements, design missions** and **design features** of the aircraft that meet the requirements. Print on a single 11x17” sheet. You may use 2 sheets if needed to convey your message.

## Status of the Design

Describe the status of the design. Describe any errors noted. Include a description of the design changes to be made for a next iteration. Details of changes shall be documented in section 2. th supporting rationale.

# System Requirements

This section documents the breakdown of the System Requirements Document (SRD) and allocation of the requirements to each of the respective responsible group, i.e. aerodynamics, performance, etc.

## Identification and Allocation

The breakdown and allocation of the requirements shall as follows:

**Table 2-1 System Requirements (Example)**



Dual requirements may be broken into two or more, if allocations are different, i.e. the weight and volume requirement of 4.1.4 may be re-written to split into 4.1.4a and 4.1.4b, and allocated to different groups. The achieved value has colored cells indicating the result. This helps the reader to focus on the risks of the design and what needs to be further discussed. Colors and text as follows:

|  |  |
| --- | --- |
| **Cell Color/Text** | **Meaning** |
| Red | Not met |
| Yellow | Not met, but close |
| Blue | Met |
| Text | State value attained, if appropriate |
| TBD | Not yet evaluated or has yet to be documented (use sparingly) |

## Design Changes Required

Any **RED** or **YELLOW** requirement shall be documented in this section and have the planned changes to return the requirement to **GREEN**. Include any supporting rationale.

# Aircraft Description

## Preliminary Sizing (Roskam, Part I)

### Preliminary Weight Estimate (Roskam, Part I): include all assumptions, graphs, comparisons of weights with similar aircraft, fuel fractions, preliminary weight breakdown, etc.

### Wing Area (S) and Takeoff Thrust (TTO) Estimate (Roskam, Part I): include all assumptions and tables to build the wing loading matching graph. The final graph shall include wing loading and takeoff thrust chosen for you aircraft. Include discussion on why you chose the values.

### Landing Gear Loads and Tire Sizing (Roskam, Part IV): include a drawing of the landing gear layout (stick figure acceptable) with loads for each strut. Specify tires chosen for use (include the tire specifications in your discussion).

## Preliminary Configuration (Roskam, Part II, III & IV)

### Describe the progression of the design, from the preliminary layout sketches, drawings and the design decisions that made it evolve into the final design. Include comparison of other aircraft in your discussion.

### Describe the influence of design requirements on the configuration, include the following in the discussion:

#### Cockpit location

#### Airfoil choices

#### Wing placement

#### Planform, sweep, taper ratio, aspect ratio, dihedral/anhedral

#### Tail sizing and tail placement

#### Control surfaces

#### High lift devices

#### Payload placement

#### Engine placement

#### Landing gear type and placement

#### Any other special features

## Configuration and Drawings

All drawing sheets shall have the team number identified in, or above, the title block, i.e. TEAM X, where X is the team number.

### General Arrangement 3-View Drawing

Include a scale 11” x 17” 3-view drawing (front, planform and side view) showing all external features with external payloads, including external fuel tanks. Drawing shall include the following dimensions in inches/degrees, except as noted:

Aircraft Coordinate System (ACS) (0,0,0) location on each view  
Overall length (ft)  
Overall height from ground (ft), with landing gear down  
Overall span, including wing tip tanks, payloads, lights, etc. (ft)  
CG location on planform view (FWD and AFT) (include FS location and %mac)  
CG location on side view (FWD and AFT) (include WL location)  
Landing Gear Down (stick figure only, no gear doors)  
Tip back angles and lateral tip over criteria  
Pilot/Co-Pilot design eye height location (FS and WL)  
Pilot/Co-Pilot look angles (forward and side)  
External payload hardpoint locations (BL)  
Leading Edge (LE) sweep angle (one panel only, each surface)  
MAC chord (one panel only, each surface)  
Wing LE MAC location from FS0 (one panel only)  
Aircraft aerodynamic center (aca) FS location (include %mac)  
Moment arm length between the .25c of surfaces (used for tail volume calculation)

### Drawing Table

Typically placed on the General Arrangement 3-view, this table is to be placed on a second 11x17 sheet for instructor convenience (readability). All units shall be inches and degrees, unless otherwise specified. Table shall show the following numerical data with additions/deletions as appropriate (**in this order**):

Wing

Planform Area, S (ft2)  
Exposed Area (ft2)  
Wetted Area (ft2)  
Reference Span, b (ft)  
Apex location, FS, BL and WL (in)  
Root chord (in)  
Tip chord (in)  
MAC (in)  
Taper ratio, Aspect ratio  
Sweep: LE, .25c, max thickness line, .50c, TE  
Incidence angle  
Airfoil section(s) and twist

Vertical, Horizontal and Canards (if applicable)

Same parameters as wing above  
Tail volume ratios

High Lift devices and control surfaces

Type of high lift device  
% chord and % span  
Area affected of surface (ft2)  
Area of surface aft of hinge line (ft2)  
MAC of control surface (in)

Fuselage

Length (ft)  
Max cross section area (ft2)  
Fineness ratio  
Wetted area (ft2)

Canopy

Length (ft)  
Wetted area (ft2)

Total airplane wetted area (ft2)

### Inboard Profile

Include a scale 11” x 17” inboard profile showing locations of all equipment, cockpit, structure and systems. May use multiple sheet for clarity of the drawing views.

Show and identify in the drawing at least the following, if installed:

Structure, including spars, ribs, frames, bulkheads, longerons, etc.  
Control Surfaces  
High lift device(s)  
Dive brakes  
Landing gear: up and down  
Gear doors: up and down  
Pilot Seats (human factors)1  
Crew Station Panels (human factors)[[1]](#footnote-1)  
Pilot Stick/Throttle (human factors)1  
Rudder Pedal (human factors)1  
Crew, passengers, and seats (human factors)1  
Passenger doors/steps  
Crew Ladder  
Baggage  
Oxygen system (tank/OBOGS)  
Environmental Control System (ECS) (AC and heat)  
Other crew/passenger supplied items  
External stores  
Internal ordnance and ammunition  
Other payload  
Engines and ducts  
Propellers or fans  
Fuel tanks and pumps  
Avionics and instruments  
Tail hook, up and down (if applicable)

# Mass Properties

Mass Properties, which include Weight, Center of Gravity (CG), and Moments of Inertia (MOI), shall be provided in Aircraft Coordinate System (ACS) as shown in Figure 4‑1 below. The abbreviations FS, BL and WL stand for Frame Station, Water Line and Butt Line respectively. These terms come from a long tradition in ship design and building. (Side note: when discussing Weight and CG, it is typically referred to Weight and Balance)



+x (FS)

+y (BL)

+z (WL)

Figure ‑ Aircraft Coordinate System Convention

## Detailed Weight Estimate

Include all equations used, showing the calculations with inputs and outputs (see Nicolai CH 20, or Roskam V).

Include a weight summary table in this format:

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  | Weight (lb) |
| Operating Empty Weight (WOE) | |  |  |
|  | Empty Weight (WE) | |  |
|  | Trapped Fuel and Oil (Wtfo) | |  |
|  | Crew Weight (WCREW) | |  |
| Fuel (WF) | |  |  |
| WOE + 60% fuel | |  |  |
| WOE + WF | |  |  |
| Payload Weight (WPL) | |  |  |
| WOE + WF + WPL | |  |  |

## Weights and CG

Include all component weights and locations in ACS to obtain an estimated CG location of the aircraft, see Table 4‑1 for example. As the design matures so does this table (See Roskam Part II CH 10 for CG estimation of major components).

Include tables for each configuration, such as CC, FC, WC, etc.

Table ‑ Mass Properties (example)



## Longitudinal CG travel

Show the following CG locations in % MAC and distance from Aircraft Coordinated System fixed y-z reference (FS) for all configurations, i.e. CC, FC, WC:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Payload | Gear | % Fuel | FS (in) | %MAC |
| Full  Payload | Up | 1 |  |  |
| 60 |  |  |
| 100 |  |  |
| Down | 1 |  |  |
| 60 |  |  |
| 100 |  |  |
| No Payload | Up | 1 |  |  |
| 60 |  |  |
| 100 |  |  |
| Down | 1 |  |  |
| 60 |  |  |
| 100 |  |  |

## Moments of Inertia **(AE 460B only)**

Expanding on the Mass Properties table, Moments of Inertia (lxx, Iyy, Izz and Ixz only) are required for only one flight condition to support the stability control analysis, see the SRD. Start with the mass properties table and add columns to include:

- Radius of gyration or Moments of Inertia (MOI) of each component  
- MOI of components transformed and summed at the ACS (0, 0, 0)  
- MOI transformed to body axis system about the CG

# Flight Loads (AE 460B only)

## Using MIL-A-8861 or 14CFR25, depending on the SRD, develop and present the composite V-n Diagrams (n vs. EAS) as follows:

- lightest weight configuration, at sea level  
- lightest weight configuration, at highest cruise altitude  
- heaviest weight configuration, at sea level  
- heaviest weight configuration, at highest cruise altitude

## Calculate aircraft loads (Aerodynamic loads) on main wing only IAW the methodology in NACA TR 921, or Airframe Structural Design (Niu) or equivalent.

# Structures (AE 460B only)

Using the developed loads perform first order structural sizing of the main spar(s) of the main wing. Use the methodology in Airframe Structural Design (Niu), Analysis & Design of Flight Vehicle Structures (Bruhn) or an equivalent source.

This section is being developed and will be ready for AE460B. The activity will be similar to AE310 final project.

# Lift, Drag and Moment Estimation

## Airfoil curves Cl vs. α curves

### Main Wing Airfoil

### Horizontal Stabilizer Airfoil

### Vertical Stabilizer Airfoil (if different from horizontal)

## Lift Curves, CL vs α (for takeoff, climb, landing)

### Conditions: Reynolds Number for V = 100 KTAS, Sea Level, 90°F day, Configuration: CC

### Takeoff/landing Curve “Build-up”

#### Show all the details to derive the curves for airfoil, wing, flaps and slats. Document all calculations and adjustments made for twist and incidence and horizontal stabilizer contribution. Construction of curves may be done on graph paper by hand (easiest way).

### CL vs α curves (takeoff, climb, landing)

The graph simplifies and “cleans up” the curves constructed in section 7.2.2, which shall show the CL vs α of the entire aircraft for CC, takeoff and landing configurations.

#### Note: Information on each CL vs α graph in section 7.2 shall include the following information:

Airfoil identification  
Re number  
S (reference area)  
AR (aspect ratio)   
Mach  
Sweep at max thickness line  
Twist angle  
Incidence angle

## CL vs α, Flight Condition to be analyzed (as required)

### See SRD. Flight condition curves will be needed to evaluate various flight conditions, i.e. high-g turns, subsonic and supersonic cruise conditions. Only develop a CLmax if required. For most cases, only the linear portion of the curve will be required for performance, stability and control purposes.

## Zero Lift Drag Coefficient

Show sample calculations with step by step process for each type of analysis, i.e. wing, fuselage, with each of the air speed regime, i.e. subsonic, transonic, and supersonic as appropriate.

### CDo vs. M graph showing the contribution of each component and combined results.

### CDo vs. M graph showing only CC, WC & FC, for applicable SRD configurations

### Sub Critical Mach Drag Buildup Equivalent Flat Plate Area (ft2) Summary

Table ‑ Equivalent Flat Plate Area Summary (example)



### Sub-critical Mach Drag Buildup CDo Summary

CDo's for Components, based on Wing Planform Area. (Table identical to the above)

## Drag Due to Lift Factor (K, K’, K’’)

Show sample calculations with step by step process for each type of analysis for each air speed regime, i.e. subsonic and supersonic as appropriate (fair transonic curve).

Show comparison with known K data values from similar aircraft.

Include a graph of K vs. M

## Drag Polar

### Graphs and formulas (place on graph) are required for the following polars:

### Configuration CC for subsonic/transonic flight (1 page)

Subcritical M: Re Number based on M = 0.7, 40K Standard  
Critical M through M = 0.95: Intervals of M = 0.05

### Configuration CC for supersonic flight (for SSBJ only) (2 page)

Two curves required, one for Endurance Mission and one for High Speed Mission. See SRD for requirements.

### Configuration WC (1 page)

Subcritical M: Re Number based on M = 0.6, 30K Standard  
Critical M through M = 0.95: Intervals of M = 0.05

### Configuration FC (1 page)

Subcritical M: Re Number based on M = 0.6, 30K Standard  
Critical M through M = 0.95: Intervals of M = 0.05

### Configuration WTO (1 page)

Re Number based on V = 100 KTAS, S.L. 90°F day  
Gear Down  
High lift devices positioned for take-off

### Configuration WL (1 page)

Re Number based on V = 100 KTAS, S.L. 90°F day  
Hook Down (if applicable)  
Gear down and gear up  
High lift devices positioned for landing

## One Engine Inoperative (OEI) Drag

### Windmilling and Boat Tail Drag

#### Conditions: Reynolds Number for V = 100 KTAS, Sea Level, 90°F day, Configuration: CC

#### Drag shall be calculated and presented. Show sample calculations with step by step process for analysis.

#### Graph Drag (lb) vs. Velocity (knots) on one graph. Use at least 3 points in the range 60 knots to 120 KTAS (i.e. 60, 90, 120)

### Trim Drag

#### Conditions: Reynolds Number for V = 100 KTAS, Sea Level, 90°F day, Configuration: CC

#### Drag shall be calculated and presented. Show sample calculations with step by step process for analysis.

#### Graph Drag (lb) vs. Velocity (KTAS) and Drag (lb) vs. Velocity (KCAS). Use at least 3 points in the range 60 knots to 120 KTAS (i.e. 60, 90, 120).

## Moment Coefficients

Determine aircraft CL vs CM curve

### Conditions: Reynolds Number for V = 100 KTAS, Sea Level, 90°F day, Configuration: CC

### Takeoff/landing Curve “Build-up”

#### Show all the details to derive the curves for airfoil, wing, flaps and slats. Document all calculations and adjustments made for twist and incidence and horizontal stabilizer contribution. Construction of curves may be done on graph paper by hand (easiest way).

### CL vs CM curves for takeoff, climb-out/approach, landing

The graph simplifies and “cleans up” the curves constructed in section 7.8.2, which shall show the CL vs CM of the entire aircraft for CC, takeoff and landing configurations.

### Cruise

#### See SRD. Flight condition curves will be needed to evaluate various flight conditions, i.e. high-g turns, subsonic and supersonic cruise conditions. For most cases, the linear portion of the curve will be required for performance, stability and control purposes.

## Summary (Standalone page)

Wing planform (reference) area = \_\_\_\_\_\_\_\_ ft2

CL Break = \_\_\_\_\_\_\_\_

Critical Mach No. = \_\_\_\_\_\_\_\_\_\_\_

Three Term Polars, M < Crit.

CD = CDo + \_\_\_\_\_\_\_\_ CL2 + \_\_\_\_\_\_\_\_ (CL - \_\_\_\_\_\_\_\_)2

|  |  |  |
| --- | --- | --- |
| Configuration | Flight Condition | CDo |
| CC | M=0.7 @40K Standard |  |
| WC | M=0.6 @30K Standard |  |
| WTO | 100 knots, sea level 90°, Day; Gear Down, T.O. Flaps |  |
| WL | 100 knots, sea level, 90° Day; Gear Down, Speed Brakes, Landing Flaps, Hook Down(if applicable) |  |

Two Term Polars:

CD = CDo + \_\_\_\_\_\_\_\_ CL2

|  |  |  |  |
| --- | --- | --- | --- |
| Flight Condition | CDo | | k |
|  | CC | WC |  |
| M<Critical |  |  |  |
| M = 0.75 (If applicable) |  |  |  |
| M = 0.80 (If applicable) |  |  |  |
| M = 0.85 |  |  |  |
| M = 0.90 |  |  |  |
| MCruise (SSBJ only) |  |  |  |

TO/L CL and CD

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | CLMAX | α for CLMAX (degrees) | CL @  Ground Attitude | CD @  Ground Attitude\* |
| TO |  |  |  |  |
| Landing |  |  |  |  |

\*Note CD @ Ground Attitude includes the reduction in induced drag for ground effect.

# Propulsion

## Engine Selection

Include rationale and calculations leading to the selection of the engines. Use of engines other than the provided is allowed, but at least two engines shall be used.

Note: Data provided for the F-91 and JT-15 engine assumes installation losses. Any other engine choice requires determination of the installation losses.

If engines are rubberized, show calculations.

## Inlet sizing

## Propulsion Integration Design

Include an 11” x 17” drawing showing the front, top and side view of one installed engine showing the following:

- Inlet design, with area and dimensions  
- Nozzle design and dimensions  
- Nacelle/pylon configuration (if applicable)

## Performance Data.

Installed performance data for all appropriate conditions in tabular and graphical form shall be included. See F-91 engine data for example of graphs.

# Performance

The following performance items should be treated in the indicated sequence. For each, present a description of the procedure, a sample calculation, and the required graphs. Only need to present the procedure and sample calculation one time.

Where the area under a curve is used in a calculation, the area and resulting value shall be shown on the graph.

If applicable, show CLbreak and MCr on each graph, to show the limitations of the data.

All missions assume Standard Atmosphere, unless otherwise noted.

## Configuration CC- Endurance Mission – **Business Jet only**

### Climb

#### One graph each for sea level, 15k, 30k, 36k, 40k, 45k or higher if applicable:

* + - * dh/dt vs. M for at least two weights over the range of possible weights for initial climb
      * Each curve should extend to the zero rate of climb axis.

#### Graph Altitude vs. (dh/dt)max for the family of weights. Show ceilings.

#### Graph Altitude vs time, weight, and distance for climb from light off at full fuel

#### Table of Altitude vs time, weight, and distance for climb from light off at full fuel (data supporting section 9.1.1.3)

### Cruise (Range and Endurance)

#### One graph each for 15k, 30k, 36k, 40k, 45k or higher if applicable:

* V/TC vs. M for a family of weights

#### Graph (V/TC)max vs. altitude for the family of weights.

#### Graph (V/TC)max vs. weight for the best range altitude.

#### One graph each for sea level, 15k, 30k, 36k, 40k, 45k or higher if applicable:

* 1/TC vs. M for a family of weights

#### Graph (1/TC)max vs. altitude for the family of weights

#### Graph (1/TC)max vs. weight for best endurance altitude.

#### Graph (1/TC)max vs. weight for sea level, end of mission.

### Segment-by-segment profile (graph and table) of design mission.

* Weight, weight of fuel, time, distance, speed and altitude at each transition point.

## Configuration CC- High Speed Mission – **Business Jet only**

### Climb and End of Mission

Assume climb and end of mission (after descending) from SRD mission profile is the same as the endurance mission.

### Cruise (Range)

#### Graph (V/TC) vs. altitude for the family of weights, using required M.

For altitudes, use 15k, 30k, 36k, 40k, 45k or higher if applicable

#### Graph (V/TC)max vs. weight for the best range altitude.

### Segment-by-segment profile (graph and table) of the design mission.

* Weight, weight of fuel, time, distance, speed and altitude at each transition point.

## Configuration FC - **CAS and APT only**

### Climb

#### One graph each for sea level, 15k, 30k, 36k, 40k, 45k:

* + - * dh/dt vs. M for at least two weights over the range of possible weights for initial climb
      * Each curve should extend to the zero rate of climb axis.

#### Graph Altitude vs. (dh/dt)max for the family of weights. Show ceilings.

#### Graph Altitude vs time, weight, and distance for climb from light off at full fuel

#### Table of Altitude vs time, weight, and distance for climb from light off at full fuel (data supporting section 9.3.1.3)

### Cruise

#### One graph each for 15k, 30k, 36k, 40k, 45k:

* V/TC vs. M for a family of weights

#### Graph (V/TC)max vs. altitude for the family of weights.

#### Graph (V/TC)max vs. weight for the best range altitude.

#### One graph each for sea level, 15k, 30k, 36k, 40k, 45k:

* 1/TC vs. M for a family of weights

#### Graph (1/TC)max vs. altitude for the family of weights

#### Graph (1/TC)max vs. weight for best endurance altitude.

#### Graph (1/TC)max vs. weight for sea level, end of mission.

### Graph segment-by-segment profile (graph and table) of the FC design mission.

* Weight, weight of fuel, time, distance, speed and altitude at each transition point.

## Configuration WC - **CAS and APT only**

### Climb

#### One graph each for sea level, 15k, 30k, 36k, 40k, 45k:

* + - * dh/dt vs. M for at least two weights over the range of possible weights for initial climb
      * Each curve should extend to the zero rate of climb axis.

#### Graph Altitude vs. (dh/dt)max for the family of weights. Show ceilings.

#### Graph Altitude vs. time, weight and distance for each climb in the design mission

#### Table of Altitude vs time, weight, and distance for climb from light off at full fuel (data supporting section 9.4.1.3)

### Cruise

#### Graph (V/TC) vs. M for 15k, 30k, 36k, 40k, 45k, for at least three weights over the range of possible weights for the design mission altitude legs

#### Graph (V/TC)max vs. weight for 15k, 30k, 36k, 40k, 45k

#### Graph V/TC vs. M for sea level, at least three weights over the range of weights for the sea level legs of the design mission

#### Graph (V/TC)max vs. weight for the design mission sea level legs

#### Graph (1/TC) vs. M, sea level, for two weights which bracket the reserve fuel requirement for the design mission

#### Graph (1/TC)max vs weight, sea level, end of design mission

### Maneuver (See SRD for any overriding requirements)

#### Show sample calculations with step by step process for each type of analysis

#### Graph Max sustained load factor vs. M, 60% fuel, 20k, climb power

#### Graph Turn Radius vs M, 60% fuel, 20K, climb power

#### Graph Turn Rate vs. M, 60% fuel, 20K, climb power

### Graph segment-by-segment profile (graph and table) of the WC design mission.

* Weight, weight of fuel, time, distance, speed and altitude at each transition point.

## Takeoff Analysis

Document takeoff analysis showing all work, with assumptions, inputs and outputs. Show takeoff profile in an illustration showing time, distance and speed. Assume sea level, 90°F day, Re for 100 knots. See SRD for details on the requirements.

## Landing Analysis

Document landing analysis showing all work, with assumptions, inputs and outputs. Show landing profile in an illustration showing time, distance and speed. Assume sea level, 90°F day, Re for 100 knots. See SRD for details on the requirements.

### Graph Approach speed (knots) vs. weight (lb): full fuel to zero, WL. Use at least three weights

### Graph Landing distance (ft) vs. weight (lb): full fuel to zero, WL. Use at least three weights. Include distance for over obstacle, flare and delay time for braking.

## One Engine Inoperative (OEI)

See SRD for details on any specific requirements.

### Conditions: Reynolds Number for V = 100 KTAS, Sea Level, 90°F day, Configuration: WTO (CCTO for SSBJ). Assume WTO (maximum ramp weight less 5 minutes at idle)

### Show planform view of aircraft, with a freebody diagram, defining all terms for the OEI analysis

### Critical Field Length shall be calculated and presented. Show sample calculations with step by step process for analysis.

### Graph Velocity (KTAS) vs. Critical Field Length (ft)

### Graph OEI Rate of Climb vs. weight: WL, Gear down. Use at least three weights, full fuel to zero.

### Graph OEI Rate of Climb vs. weight: WL, Gear up. Use at least three weights, full fuel to zero.

## Performance Summary

### Flight Envelope: Altitude vs. M showing stall and buffet limits and thrust limits.

### Use the table format of Section 2 to summarize the performance results.

# Stability and Control

## Static Longitudinal Stability and Control

### Present horizontal tail (or canard) sizing showing required static stability criteria are met

### Present horizontal tail (or canard) sizing showing required control requirement with the following criteria:

- Trim drag at cruise is <10% total aircraft drag   
- High G-maneuver requirement can be met (instantaneous and sustained)  
- Take-off rotation can be made at most forward CG location  
- High AoA at low speed during landing approach

## Static Directional Stability and Control

### Present vertical tail sizing showing required static stability criteria are met.

### Present vertical tail sizing showing required control requirement for OEI is met.

## Aileron Sizing **(AE460B only)**

Present aileron sizing to ensure the roll requirement is met (see SRD)

## Stability of Uncontrolled Motion, Dynamic Stability **(AE460B only)**

The section shall include all inputs to the non-dimensional stability derivatives, including flight condition being analyzed, aircraft design properties, i.e. weight, CG, wing, fuselage and tail dimensions, aerodynamic properties, and steady state coefficients. Include a summary table showing the weight, altitude, Mach No., angle of attack, plus lxx, Iyy, Izz and Ixz about the stability axes.

See class presentation for information required in this report for diagrams, equations and sample calculations.

Computer code and/or spreadsheets shall be submitted to the instructor electronically (to save paper) or included in the appendix.

Results shall be presented similar as shown in class and provided on course website.

# Configuration Spreadsheet

A standardized spreadsheet will be provided by the instructor to submit your configuration. Do not reformat the spreadsheet. Ensure values are provided in the specified units.

# Life Cycle Costs

Include Development, Test and Evaluation (DT&E) costs in this year’s dollars for 9 development aircraft with a production order of 200. See Nicolai, CH 24 for table format.

# References

In all cases references shall be cited.

# Bibliography

Add any published works used that are not cited in the report, i.e. military specifications, NACA reports, instruction manuals for software programs, etc.

**Appendices**

## Course Description

## Statement of Work

1. Report Content Requirements
2. System Requirement Document

## Work Breakdown Structure (signed)

1. Computer Program Listings

Source Code Listings for ALL programs other than the products of major software such as EXCEL, WORD, etc. used, shall be included. May supply the code on disk. If supplied on disk, describe the code in this section that correlates to your code. Index the code with F.n (where n is the index for each code, i.e. F.1., F.2., etc.).

1. EXCEL spreadsheets used for input to report. May supply the spreadsheet on disk. If supplied on disk, describe the code in this section that correlates to your code. Index the spreadsheets with G.n (where n is the index for each spreadsheet, i.e. G.1., G.2., etc.).
2. Technical Memos, H.n (where n is the index for each memo, i.e. H.1., H.2., etc.).

1. Human Factor: These items shall be presents in its own detailed view showing how they meet human factor requirements. [↑](#footnote-ref-1)