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AIAA Design/Build/Fly Competition
2020-2021 Aircraft Design Report

Contents

I. Executive Summary (5 Points)

- Maximum of 1 page. If exceeded, score as 0 points
- Summary description of selected design and why it best meets the mission requirements
- Main points from subsequent sections
- Document the performance/capabilities of your system solution

Table 1 Summary of major system perfomance factors.

Metric	
	Performance (units)
	Performance (units)

II. Management Summary (5 Points)

Paragraph describing the organization of the design team, citing figure 1.

Figure 1 This chart depicts the design personnel and assignment areas within our team structure.

2nd paragraph about milestone chart shown in figure 2 (be brief).

Figure 2 This milestone chart reveals our original plan for major elements of our design process compared to the actual timing of these events.

III. Conceptual Design (15 Points)

A. Mission Requirements

Describes mission requirements (problem statement)

Translate mission requirements into sub system design requirements

1. Aerodynamic Requirements

2. Structural Requirements

3. Propulsion Requirements

4. Specialty Requirements

B. Scoring Sensitivity Analysis

Present a scoring sensitivity analysis.

C. Concept Weighting and Selection Process

Review solution concepts/configurations considered

Describe concept weighting and selection process and results

Table 2 Figures of Merit

Factor	Relative Importance (1-5)

Table 3 Weighted decision (Pugh) matrix.

Factor	Weight	Option 1	Option 2	Option 3
Totals				

1. Final Concept

IV. Preliminary Design (20 Points)

A. Methodology

Describe design/analysis methodology

B. Trade Studies

Document design/sizing trades

Figure 3 Here we show a sampling of the design concepts we rejected along the way as we honed in on our final design concept (see figure 4).

Figure 4 Our final conceptual design incorporates the highest scoring options in the decision matrices described above.

C. Estimated Aircraft Performance

Describe/document methodology for prediction of aircraft performance (include capabilities and uncertainties)

1. Uncertainty Analysis

Describe the capabilities and uncertainties of the tools used for performance estimation.

2. Lift and Drag

Provide estimates of the aircraft lift, drag and stability characteristics and method of prediction

3. Stability

4. Mission Performance

Provide estimates of the aircraft mission performance

V. Detail Design (15 Points + 15 Points for Drawing Package)

A. Sizing

Document dimensional parameters of final design

B. Structures

Document structural characteristics/capabilities of final design

C. System Selection, Integration, and Architecture

Document systems and sub-systems selection/integration/architecture

D. Weights and Balance

Document Weight and Balance for final design

Must include Weight & Balance table empty and with each possible payload/configuration

Table 4 Weight and Balance table including empty aircraft and each possible configuration.

Configuration	Weight (grams)	CG Location (mm)
Empty		
Config 1		
Config 2		

E. Flight Performance Parameters

Document flight performance parameters for final design

F. Mission Performance

Document mission performance for final design

G. Drawing Package

The following are drawings including a 3-View drawing with dimensions of all configurations, a structural arrangement drawing, a systems layout/location drawing, and payload accommodation drawings.

Figure Placeholder

Figure Placeholder

Figure Placeholder

Figure Placeholder

VI. Manufacturing Plan (5 Points)

Document the process selected for major component manufacture

Manufacturing processes investigated and selection process and results

Manufacturing milestones chart: plan and actual

Table 5 Figures of Merit

Factor	Relative Importance (1-5)

Table 6 Weighted decision (Pugh) matrix for manufacturing plan.

Factor	Weight	Option 1	Option 2	Option 3
Totals				

Figure 5 This milestone chart reveals our original plan for major elements of our manufacturing process compared to the actual timing of these events.

VII. Testing Plan (5 points)

A. Completed Testing

Describe all major ground and flight tests performed.

Objectives and schedule for each.

Data to be collected and how applied.

1. *Ground Testing*
2. *Flight Testing*

B. Planned Testing

Objectives and schedule for each.

Data to be collected and how applied.

C. Test and Flight Checklists

VIII. Performance Results (10 Points)

- Describe the demonstrated performance of key subsystems following execution of testing plan
- Compare to predictions and explain any differences and improvements made
- Describe the demonstrated performance of your complete aircraft solution
- Compare to predictions and explain any differences and improvements made