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UNIVERSITY

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

Contents

I. Executive Summary

Table 1 Summary of major system perfomance factors.

Metric	
	Performance (units)
	Performance (units)

II. Management Summary

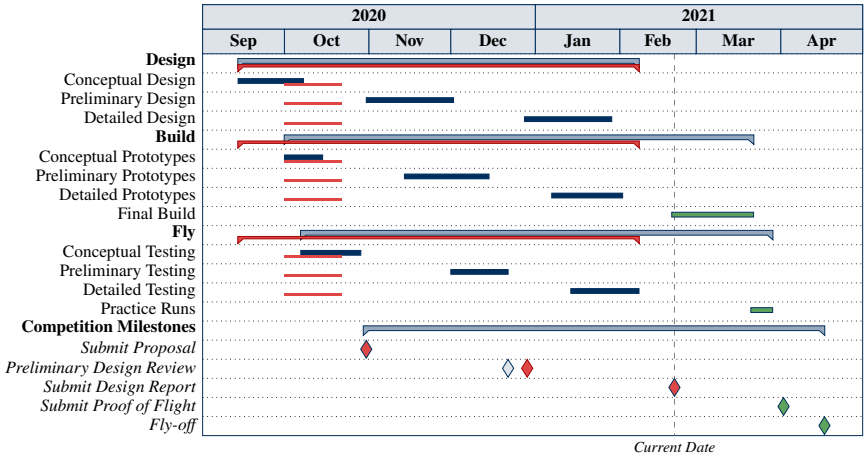

Figure 2 This milestone chart reveals our original plan for major elements of our design process compared to the actual timing of these events. Note that we submitted the proposal on time, as well as this report. We anticipate remaining on schedule for the future elements of this chart.

III. Conceptual Design

A. Mission Requirements

B. Sub-system Design Requirements

Aerodynamic Requirements

Structural Requirements

Propulsion Requirements

Specialty Requirements

C. Scoring Sensitivity Analysis

D. Concept Weighting and Selection Process

Table 2 Figures of Merit

Factor	Scale (1-5)
Weight	5
Drag	4
Simplicity	3
Stability	2
[YEAR SPECIFIC ITEM]	1

Final Concept

IV. Preliminary Design

A. Methodology

Table 3 Weighted decision matrix for wing configuration.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

Table 4 Weighted decision matrix for wing placement.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

Table 5 Weighted decision matrix for tail configuration.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

B. Trade Studies

C. Estimated Aircraft Performance

Performance Prediction Methodologies and Uncertainties

Lift and Drag

Stability

Mission Performance

Table 6 Weighted decision matrix for propulsion configuration.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

Table 7 Weighted decision matrix for wing placement.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

Table 8 Weighted decision matrix for [SPECIFY THIS YEAR'S PAYLOAD DESIGN].

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

V. Detail Design

A. Sizing

B. Structures

C. System Selection, Integration, and Architecture

D. Weights and Balance

E. Flight Performance Parameters

F. Mission Performance

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

Figure 3 Our final conceptual design incorporates the highest scoring options in the decision matrices described above.

Table 9 Weight and Balance table including empty aircraft and each possible configuration.

Configuration	Weight (grams)	CG Location (mm)
Mission 1		
Mission 2		
Mission 3		

VI. Manufacturing Plan

Table 10 Figures of Merit

Factor	Relative Importance (1-5)

Table 11 Weighted decision matrix for wing manufacturing technique.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

VII. Testing Plan

A. Completed Testing

Ground Testing

Flight Testing

Table 12 Weighted decision matrix for fuselage manufacturing technique.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

Table 13 Weighted decision matrix for tail manufacturing technique.

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

Table 14 Weighted decision matrix for [SPECIFY THIS YEAR'S PAYLOAD DESIGN].

Factor	Scale	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3	[OPTION] *Figure Placeholder* Aspect ratio = 4:3
Weight	5			
Drag	4			
Simplicity	3			
Stability	2			
[YEAR SPECIFIC ITEM]	1			
Totals				

B. Planned Testing

C. Test and Flight Checklists

VIII. Performance Results

Figure 4 This milestone chart reveals our original plan for major elements of our manufacturing process compared to the actual timing of these events.