

Massachusetts Institute of Technology  
Unified Engineering  
Spring 2004  
16.030/16.040

# System Problem 8

## Report 1

Date:

Group #

Name 1

Name 2

Name 3

Name 4

Name 5

\*You may use your own cover page. However, all the information on this cover page must be included on your cover page.

## I. Build

### I.1 Build Goals

I.1.1 System

I.1.2 Wing

I.1.3 Tail

I.1.4 Payload Accommodation

I.1.5 Propulsion

I.1.6 Landing Gear

I.1.7 (Subsystem)

### I.2 Build and Manufacturing Procedures

I.2.1 System

I.2.2 Wing

I.2.3 Tail

I.2.4 Payload Accommodation

I.2.5 Propulsion

I.2.6 Landing Gear

I.2.7 (Subsystem)

### I.3 Build and Manufacturing Schedule

I.3.1 System

I.3.2 Wing

I.3.3 Tail

I.3.4 Payload Accommodation

I.3.5 Propulsion

I.3.6 Landing Gear

I.3.7 (Subsystem)

### I.4 Build and Manufacturing Time Estimates and Actuals

I.4.1 System

I.4.2 Wing

I.4.3 Tail

I.4.4 Payload Accommodation

I.4.5 Propulsion

I.4.6 Landing Gear

I.4.7 (Subsystem)

#### Build and Manufacturing Time Estimates and Actuals

	Estimate [hrs]	Actual [hrs] YTD
Wing		
Tail		

<b>Payload Accommodation</b>		
<b>Propulsion</b>		
<b>Landing Gear</b>		
<b>(Subsystem)</b>		
<b>Integration</b>		
<b>System Total</b>		

**I.5 Build Status, Problems, and Problem Resolution**

**I.5.1 System**

**I.5.2 Wing**

**I.5.3 Tail**

**I.5.4 Payload Accommodation**

**I.5.5 Propulsion**

**I.5.6 Landing Gear**

**I.5.7 (Subsystem)**

## II. Test

### II.1 Test Goals

II.1.1 System

II.1.2 Wing

II.1.3 Tail

II.1.4 Payload Accommodation

II.1.5 Propulsion

II.1.6 Landing Gear

II.1.7 (Subsystem)

### II.2 Test Procedures

II.2.1 System

II.2.2 Wing

II.2.3 Tail

II.2.4 Payload Accommodation

II.2.5 Propulsion

II.2.6 Landing Gear

II.2.7 (Subsystem)

### II.3 Test Schedule

II.3.1 System

II.3.2 Wing

II.3.3 Tail

II.3.4 Payload Accommodation

II.3.5 Propulsion

II.3.6 Landing Gear

II.3.7 (Subsystem)

### II.4 Test Time Estimates and Actuals

II.4.1 System

II.4.2 Wing

II.4.3 Tail

II.4.4 Payload Accommodation

II.4.5 Propulsion

II.4.6 Landing Gear

II.4.7 (Subsystem)

#### Test Time Estimates and Actuals

	Estimate [hrs]	Actual [hrs] YTD
Wing		

<b>Tail</b>		
<b>Payload Accommodation</b>		
<b>Propulsion</b>		
<b>Landing Gear</b>		
<b>(Subsystem)</b>		
<b>Integration</b>		
<b>System Total</b>		

## **II.5 Test Status, Problems, and Problem Resolution**

**II.5.1 System**

**II.5.2 Wing**

**II.5.3 Tail**

**II.5.4 Payload Accommodation**

**II.5.5 Propulsion**

**II.5.6 Landing Gear**

**II.5.7 (Subsystem)**

### III. Training

#### III.1 Training Goals

III.1.1 System

III.1.2 Ground Crew

III.1.3 Pilot

#### III.2 Training Procedures

III.2.1 System

III.2.2 Ground Crew

III.2.3 Pilot

#### III.3 Training Schedule

III.2.1 System

III.2.2 Ground Crew

III.2.3 Pilot

#### III.4 Training Time Estimates and Actuals

III.2.1 System

III.2.2 Ground Crew

III.2.3 Pilot

#### Training Time Estimates and Actuals

	Estimate [hrs]	Actual [hrs] YTD
Ground Crew		
Pilot		
Other		
System		

#### III.5 Training Status, Problems, and Problem Resolution

III.5.1 System

III.5.2 Ground Crew

III.5.3 Pilot

## IV. System Performance

### IV.1 System Performance

**\*\*PLEASE NOTE THE UNITS REQUESTED!\*\***

**Fill in data that is available at the time that Report 1 is due**

#### System Performance Against Predicted Goals

	Design/Predicted/ or Assumed Value	Actual Value
<b>Ma - Mass of Aircraft [oz]</b>		
<b>b - Wing Span [in]</b>		
<b>c - Mean Aerodynamic Chord [in]</b>		
<b>Length [in]</b>		
<b>S - Wing Surface Area [in<sup>2</sup>]</b>		
<b>AR - Aspect Ratio</b>		
<b>W/S - Wing Loading (max weighted) [oz/ft<sup>2</sup>]</b>		
<b>Aileron Area [in<sup>2</sup>]</b>		
<b>Stabilizer Area [in<sup>2</sup>]</b>		
<b>Elevator Area [in<sup>2</sup>]</b>		
<b>Tail Area [in<sup>2</sup>]</b>		
<b>Rudder Area [in<sup>2</sup>]</b>		
<b>Wing Mass [oz]</b>		
<b>Aileron Mass [oz]</b>		
<b>Stabilizer Mass [oz]</b>		
<b>Elevator Mass [oz]</b>		
<b>Tail Mass [oz]</b>		
<b>Rudder Mass [oz]</b>		
<b>Landing Gear Mass [oz]</b>		
<b>Fuselage Mass [oz]</b>		
<b>Number of Servos</b>		
<b>Total Servo Mass [oz]</b>		
<b>Motor Controller Mass [oz]</b>		
<b>Receiver Mass [oz]</b>		
<b>Motor Mass [oz]</b>		
<b>Battery Mass [oz]</b>		
<b>Propeller Mass [oz]</b>		
<b>Motor Gear Mass [oz]</b>		
<b>V<sub>c,weighted</sub> - Cruise Velocity (max weighted) [mph]</b>		
<b>V<sub>c,empty</sub> - Cruise Velocity (empty) [mph]</b>		
<b>Re - Reynolds Number</b>		
<b>C<sub>L,cruise</sub> (max weighted) - Lift Coefficient</b>		
<b>C<sub>D,cruise</sub> (max weighted) - Drag Coefficient</b>		

<b>D – Drag (weighted) [oz]</b>		
<b>P – Propeller Pitch [in]</b>		
<b>D – Propeller Diameter [in]</b>		
<b>P/D – Propeller Pitch-Diameter Ratio</b>		
<b><math>\eta_{prop}</math> - Propeller Efficiency</b>		
<b><math>P_{req}</math> – Required Power (cruise, max weighted) [W]</b>		<b>Not applicable</b>
<b><math>P_m</math> – Motor power (cruise, max weighted) [W]</b>		<b>Not applicable</b>
<b>RPM – Motor RPM (cruise, max weighted)</b>		<b>Not applicable</b>
<b><math>I_m</math> – Motor Current (cruise, max weighted) [A]</b>		
<b><math>\eta_{motor}</math> – Motor efficiency (<math>P_m/P_{in}</math>)</b>		
<b><math>V_s</math> – Stall Speed (max weighted) [mph]</b>		
<b><math>C_{L,max}</math> (max weighted) – Lift Coefficient</b>		<b>Not applicable</b>
<b><math>R_{min}</math> – Minimum Turn Radius (max weighted) [ft]</b>		
<b><math>s_g</math> – Ground Roll (max weighted) [ft]</b>		
<b><math>T_1</math> – Empty Lap Time [sec]</b>		
<b><math>T_2</math> – Pit Crew and/or Repair Time [sec]</b>		
<b><math>L_3</math> – Endurance Time [sec]</b>		
<b>Score [sec]</b>		

**IV.2 System Performance Problems, and Problem Resolution**



## Appendix

**A. Build Log**

**B. Test Log**

**C. Training Log**

**C.1 Ground Crew**

**C.2 Pilot**

**C.3 System**