UAS Paradroguer Research and Development
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College of Engineering
Aerial Refueling & Drones
Increasing Stability
Computational Fluid Dynamics

Pre-Processing
Pointwise

Solving
Ansys Fluent

Post-Processing
Fieldview
3D Models & Variations: Base Model & Chute Cross Section

- Semicircle
- Shallow
- Deep
3D Models & Variations: Gore Spacing

- Rectangular – Evenly Spaced
- Rectangular – Unevenly Spaced
- Stripes
3D Models & Variations: Chute AOA

45 Degrees

60 Degrees

75 Degrees
Paradrogue Simulation Conditions

**MQ-5B Hunter**
- Flight Speeds: 60 – 120 knots
- Wing Span: 34.25 ft
- Endurance: 21 hours

**MQ-8B Fire Scout**
- Flight Speeds: 85 knots
- Rotor Diameter: 27.5 ft
- Endurance: 595 nmi or 7.75 hours
Drag Coefficient by Model

Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Drag Coefficient</th>
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</thead>
<tbody>
<tr>
<td>Semicircle</td>
<td>1.49</td>
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<tr>
<td>Shallow</td>
<td>1.01</td>
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<tr>
<td>Deep</td>
<td>1.38</td>
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<tr>
<td>Rectangle Even</td>
<td>0.26</td>
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<tr>
<td>Rectangle Uneven</td>
<td>0.24</td>
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<tr>
<td>Stripes</td>
<td>1.05</td>
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<tr>
<td>Stripes 45 Degrees</td>
<td>0.89</td>
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<td>Stripes 60 Degrees</td>
<td>1.04</td>
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<td>Stripes 75 Degrees</td>
<td>0.79</td>
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Simulation Results: Chute Cross Section
Simulation Results: Gore Spacing
Simulation Results: Chute AOA
Transient Flow
Questions
Works Cited


