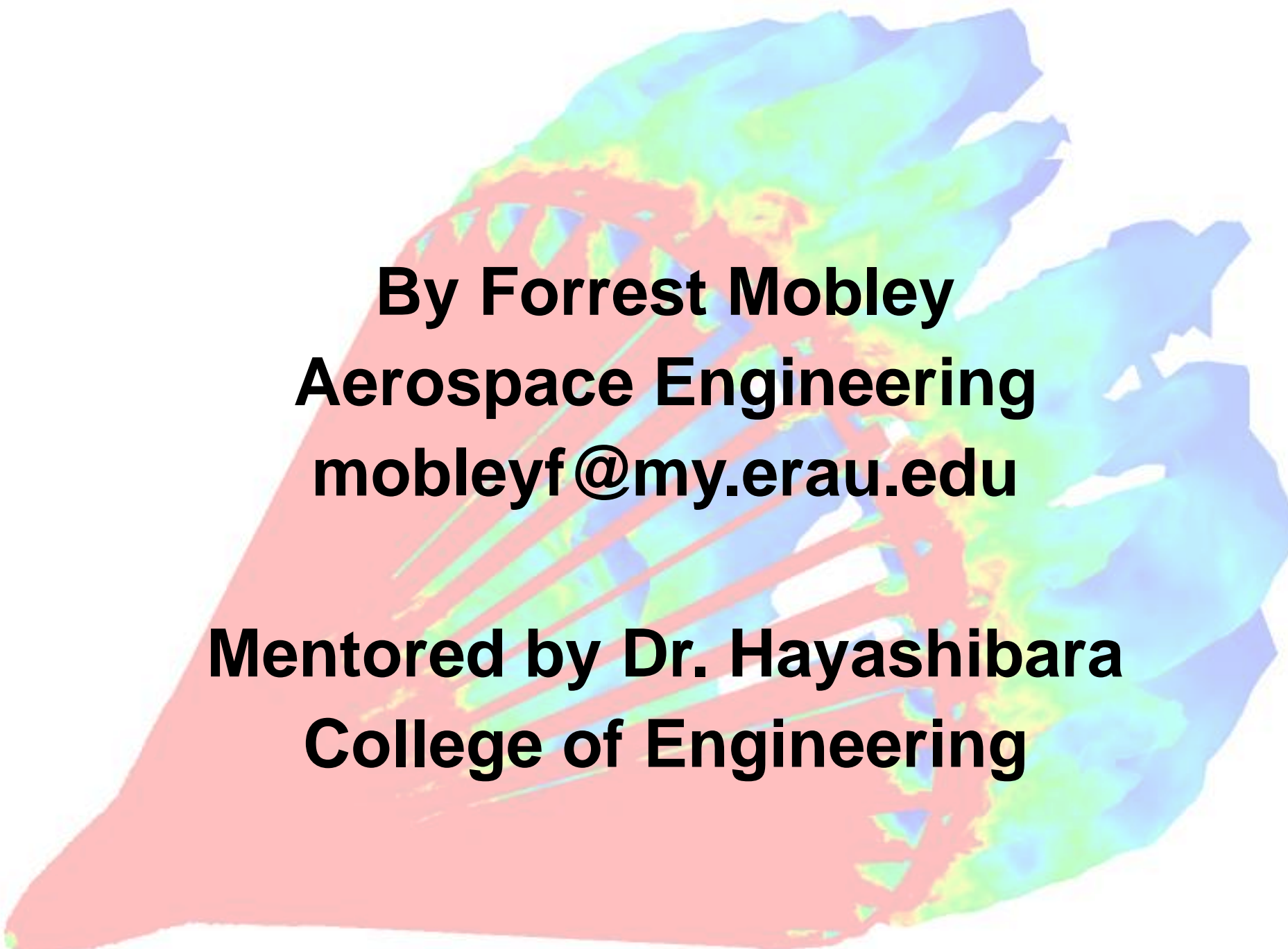




UAS Paratrogue Research and Development

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College of Engineering

Aerial Refueling & Drones



Increasing Stability



Computational Fluid Dynamics



Pre-Processing



Pointwise

Solving



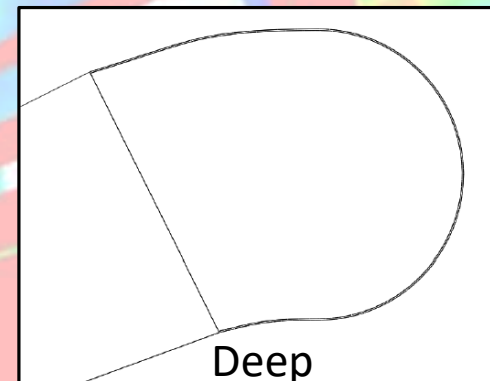
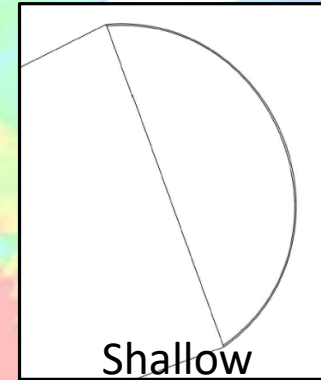
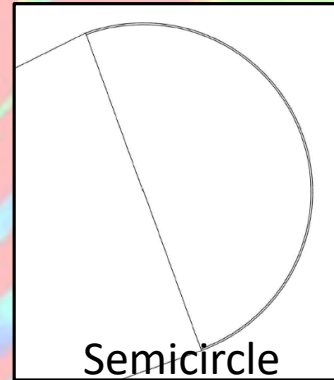
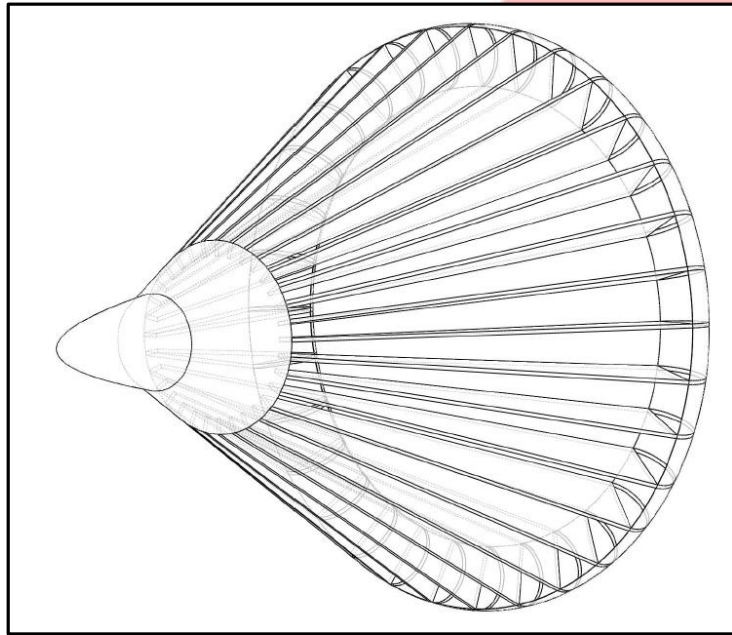
Ansys Fluent

Post-Processing

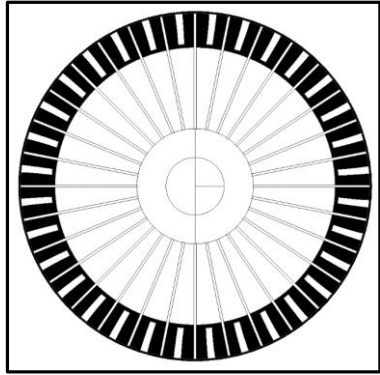


Fieldview

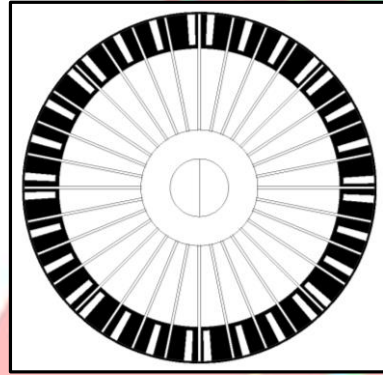
3D Models & Variations: Base Model & Chute Cross Section



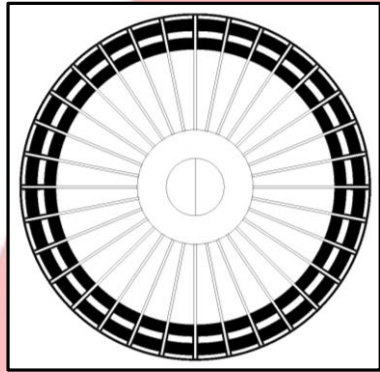
3D Models & Variations: Gore Spacing



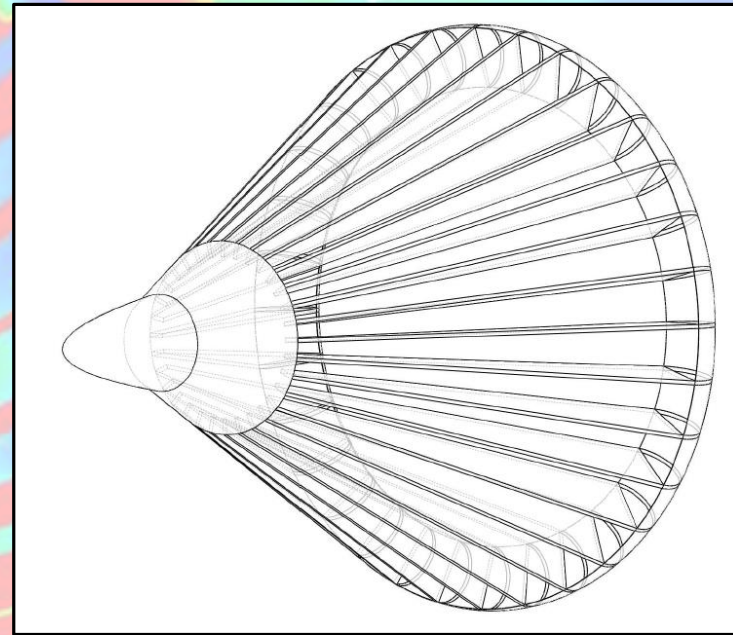
Rectangular –
Evenly Spaced



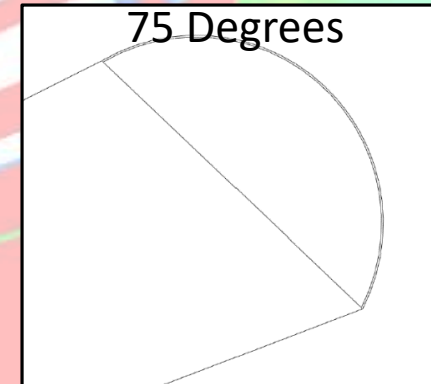
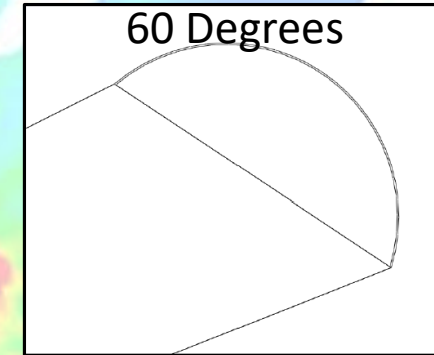
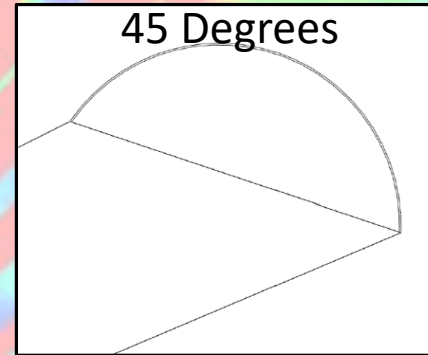
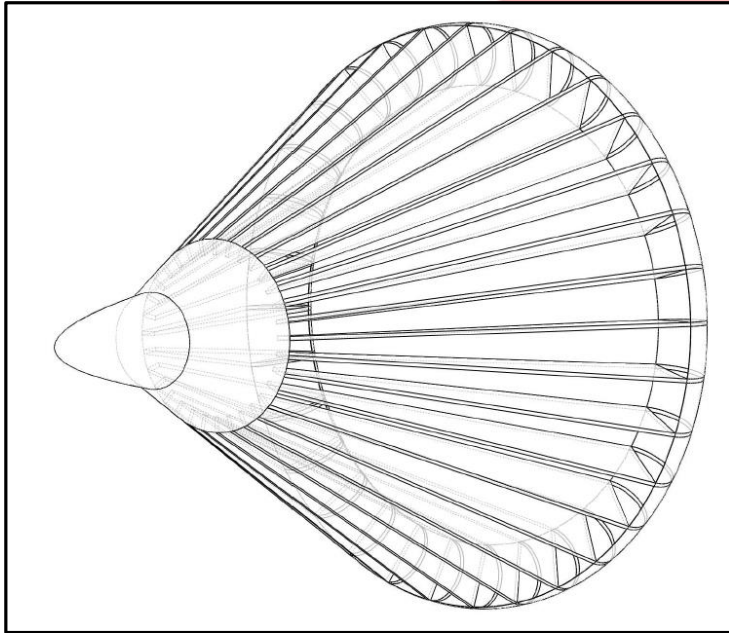
Rectangular –
Unevenly Spaced



Stripes



3D Models & Variations: Chute AOA



Paradrogue Simulation Conditions



MQ-5B Hunter

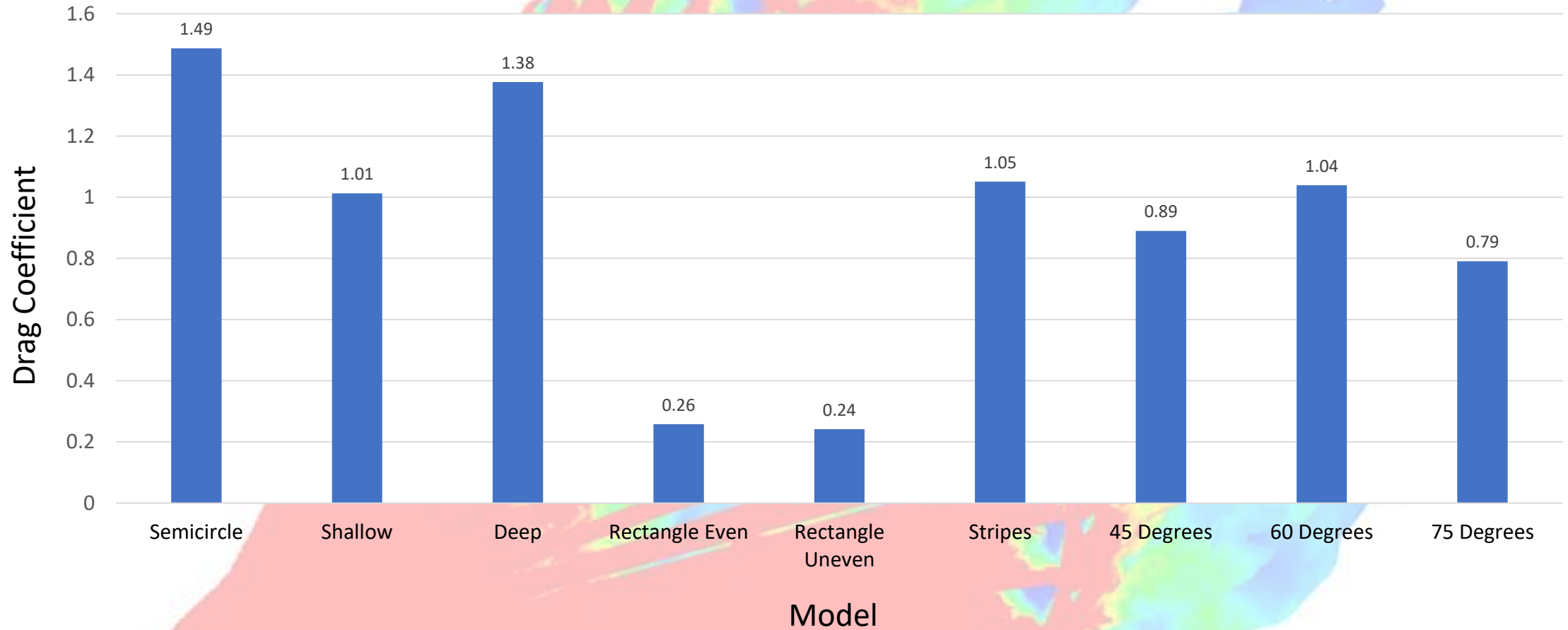
- Flight Speeds: 60 – 120 knots
- Wing Span: 34.25 ft
- Endurance: 21 hours



MQ-8B Fire Scout

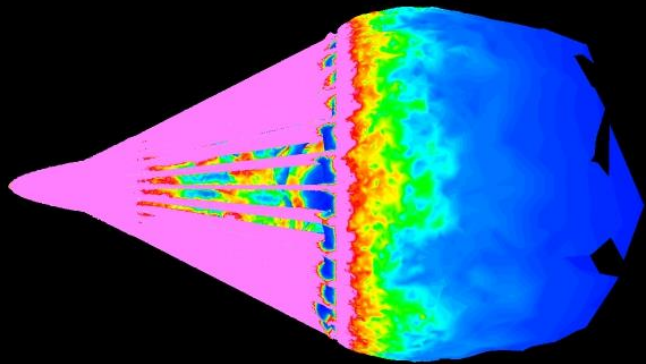
- Flight Speeds: 85 knots
- Rotor Diameter: 27.5 ft
- Endurance: 595 nmi or 7.75 hours

Drag Coefficient by Model

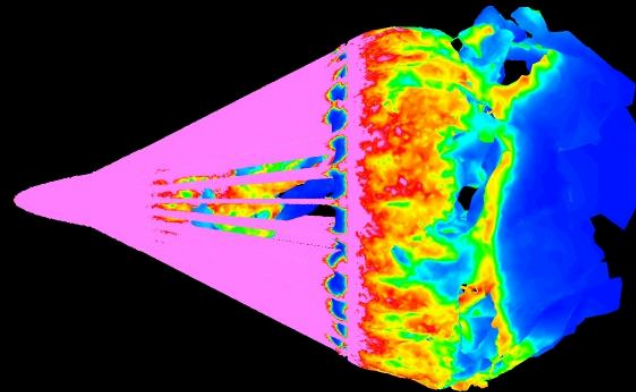


Simulation Results: Chute Cross Section

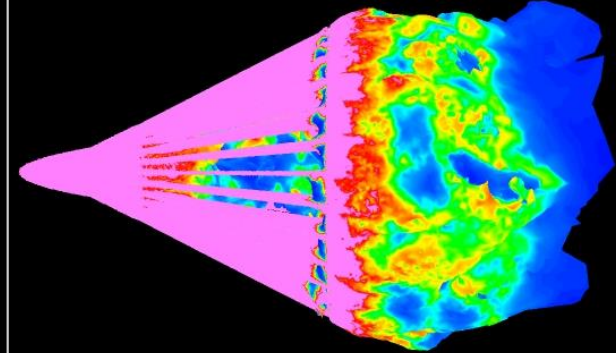
Chute Cross Section - Semicircle



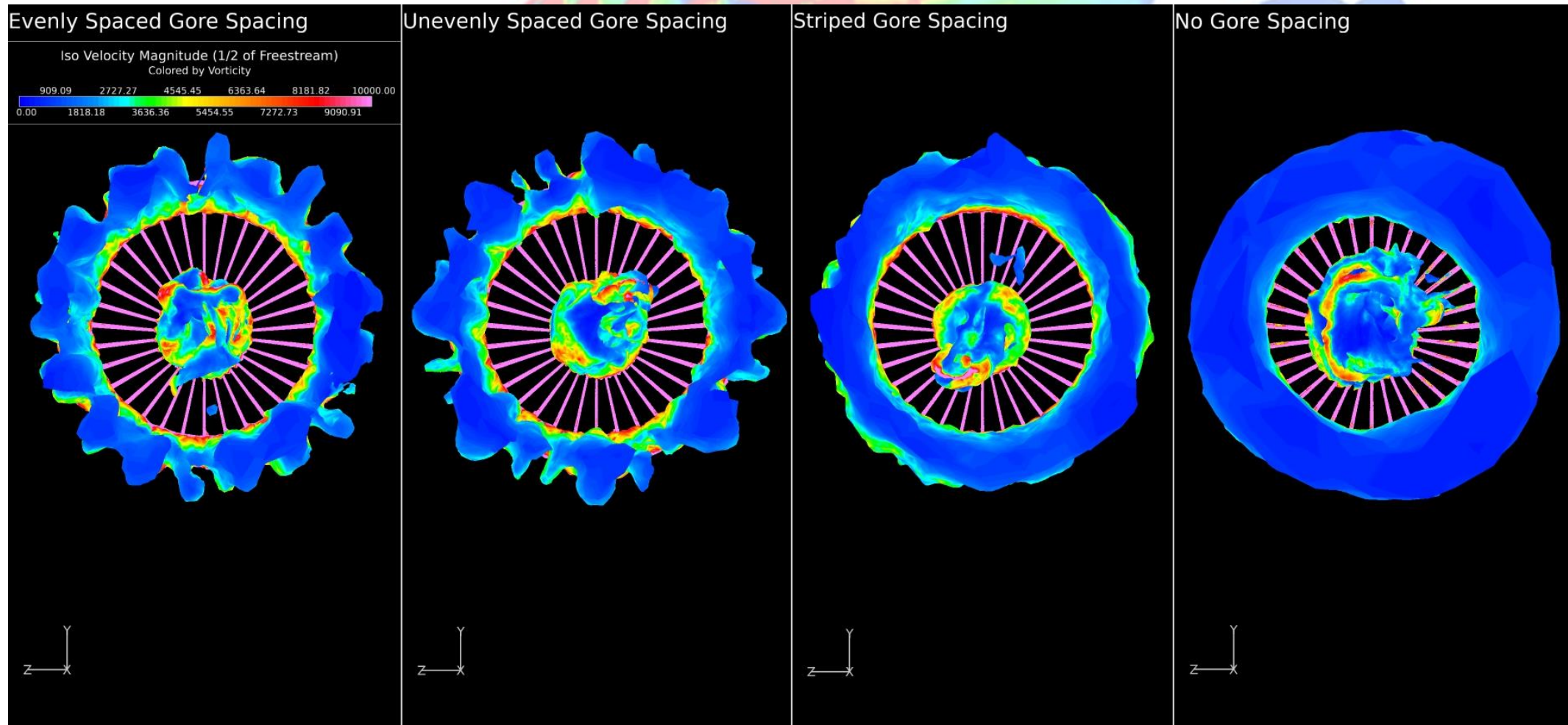
Chute Cross Section - Shallow



Chute Cross Section - Deep

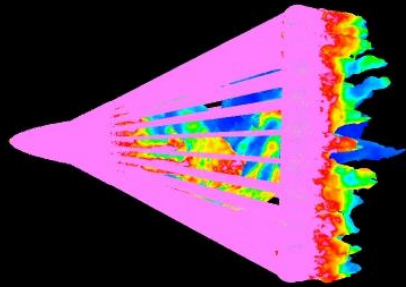


Simulation Results: Gore Spacing

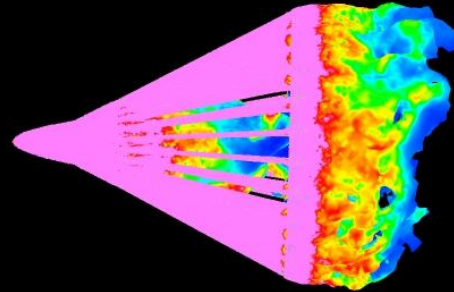


Simulation Results: Chute AOA

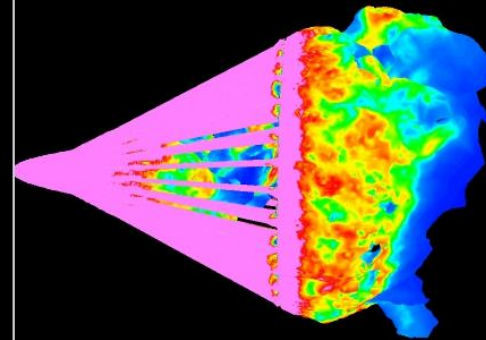
Chute AOA: 45 Degrees



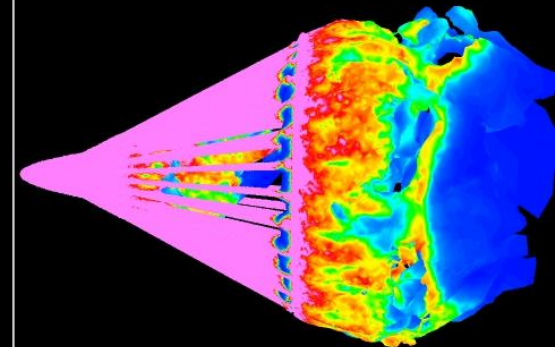
Chute AOA: 60 Degrees



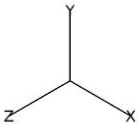
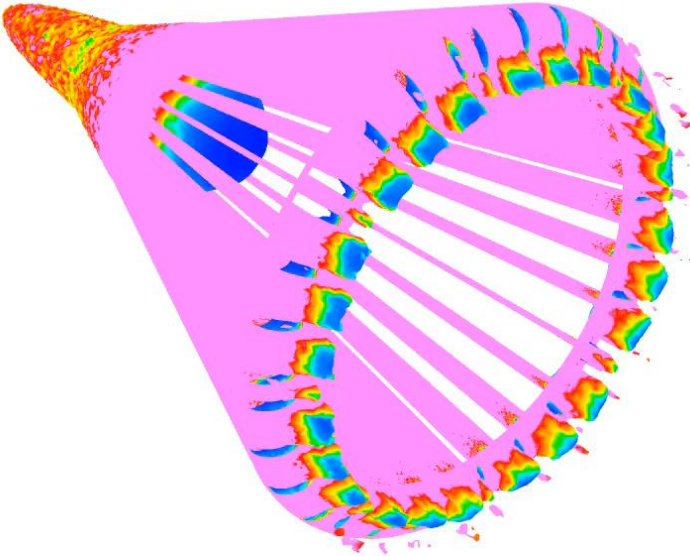
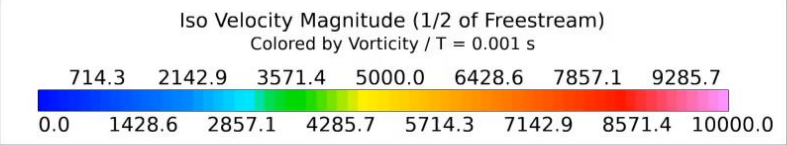
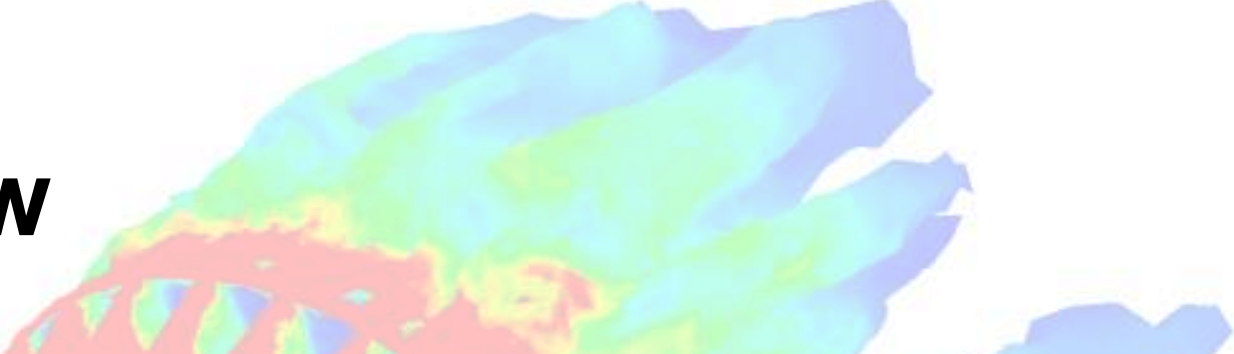
Chute AOA: 75 Degrees

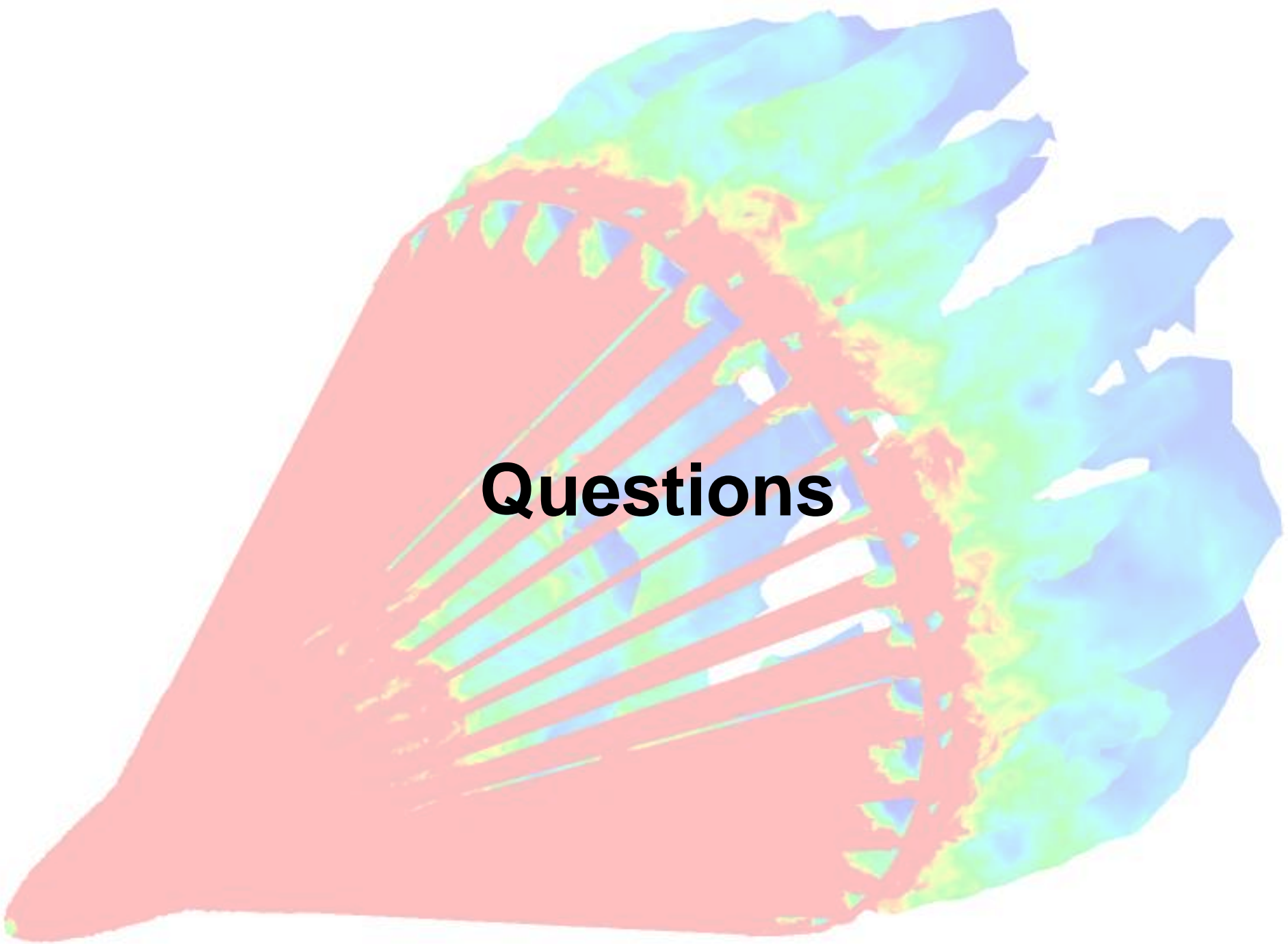


Chute AOA: 90 Degrees



Transient Flow





Questions



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