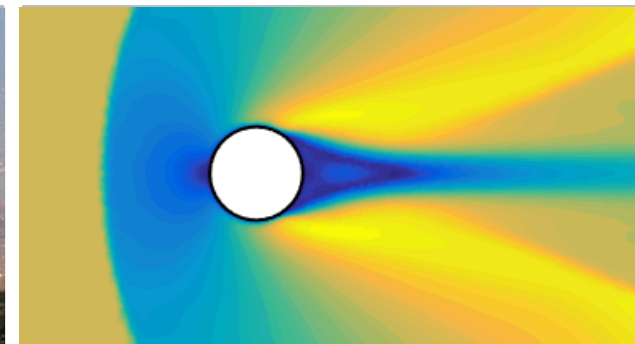


*Exceptional service in the national interest*

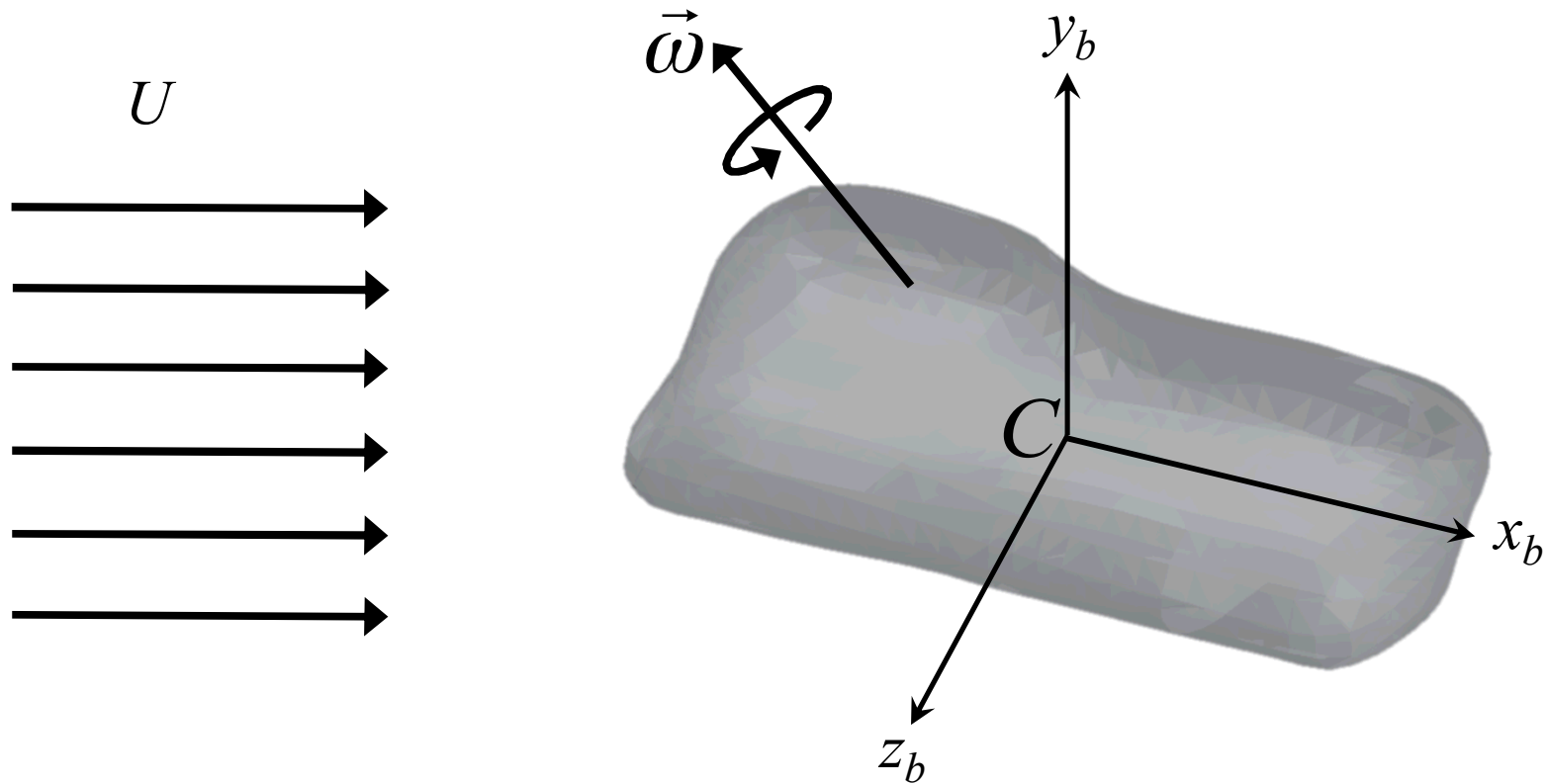


8/30/2016

## Simulations of High Speed Fragment Trajectories

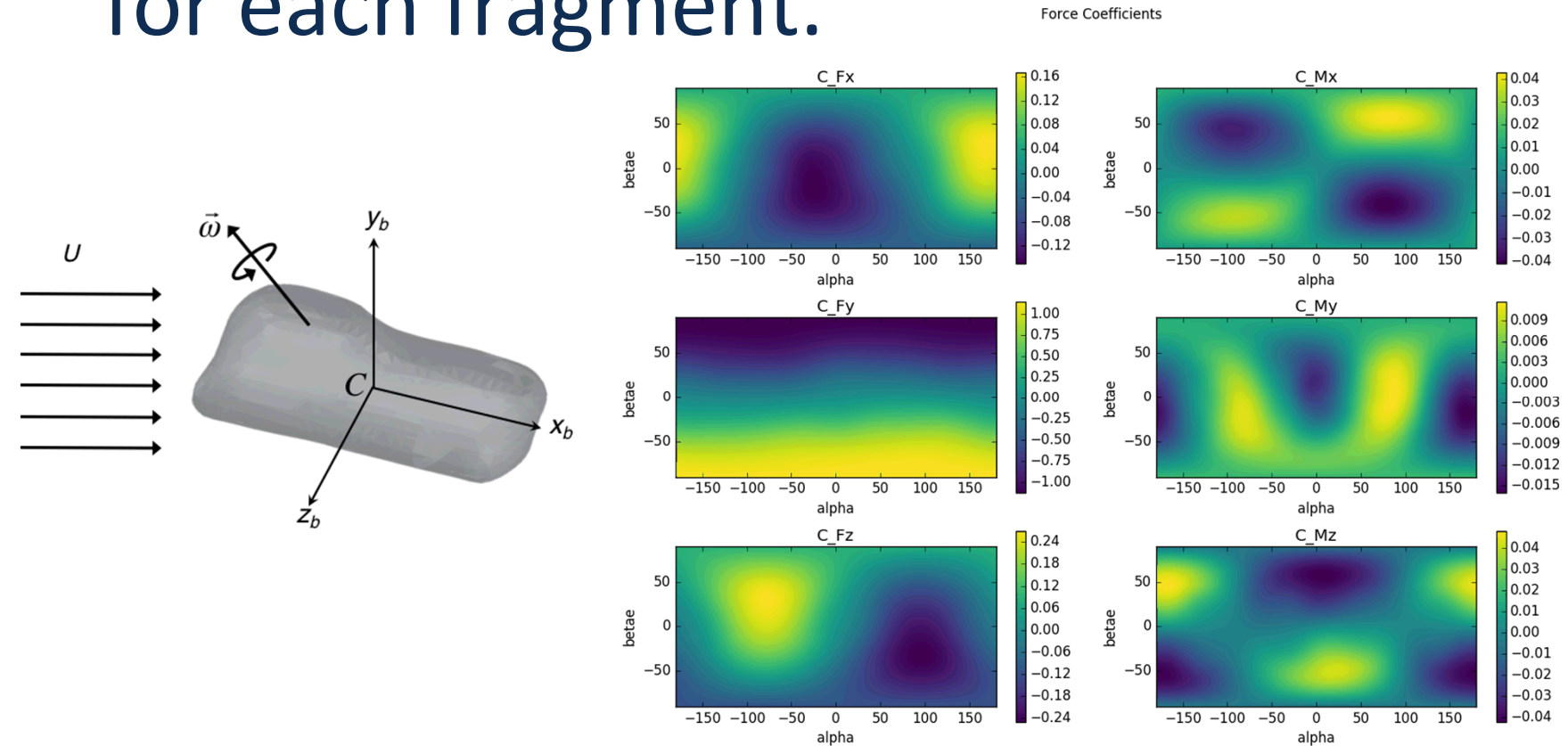
Peter D. Yeh, Stephen W. Attaway,  
Srinivasan Arunajatesan, Travis C. Fisher

# Forces/moments computed on fragment in steady flow.



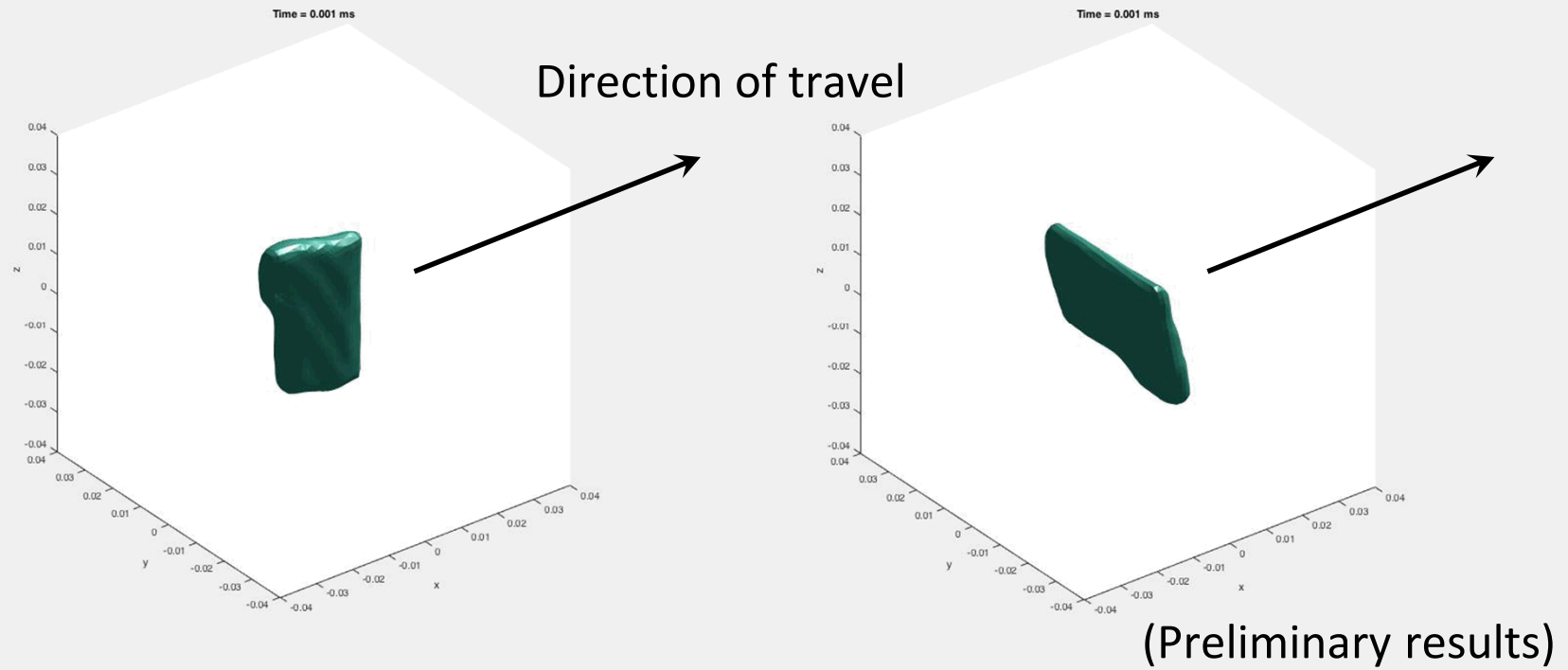
- Sample multiple orientations in rotation space (2 orientation angles)
- Generate aerodynamic database of force/moment coefficients

# Aerodynamic database generated for each fragment.



- 6 contour plots of each force/moment coefficient, 1 set per fragment
- Forces/moments linearly interpolated during each time step within 6DOF integration

# 6DOF trajectory varies based on initial conditions.



- Integrate trajectories using 6DOF solver based on Taos (SAND99-0811)
- Observe chaotic tumbling and stabilized spin behavior

# More work required to understand distribution of trajectories.

- Some fragments difficult to mesh
- Automation of simulation procedure to efficiently handle set of fragments
- Comparison to experiments for validation

