Visualizing the Tangoroa

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What is the Tangoroa, and Why Care?

- Tangoroa Research Vessel
  - Research Vessel from New Zealand
  - Employs dynamic positioning to stabilize itself
- Our goals
  - Visualize air currents around the vessel
  - Gain an understanding of how the vessel's shape affects the flow to inform the dynamic positioning system

The Dataset: What is in There?

- There were three main groups of VTK files, 200 timesteps each
  - Each group (U, V, and W) were a point in a vector shown as a scalar
  - After combining the data we were able to see the resulting vector field

Visualization from the dataset source

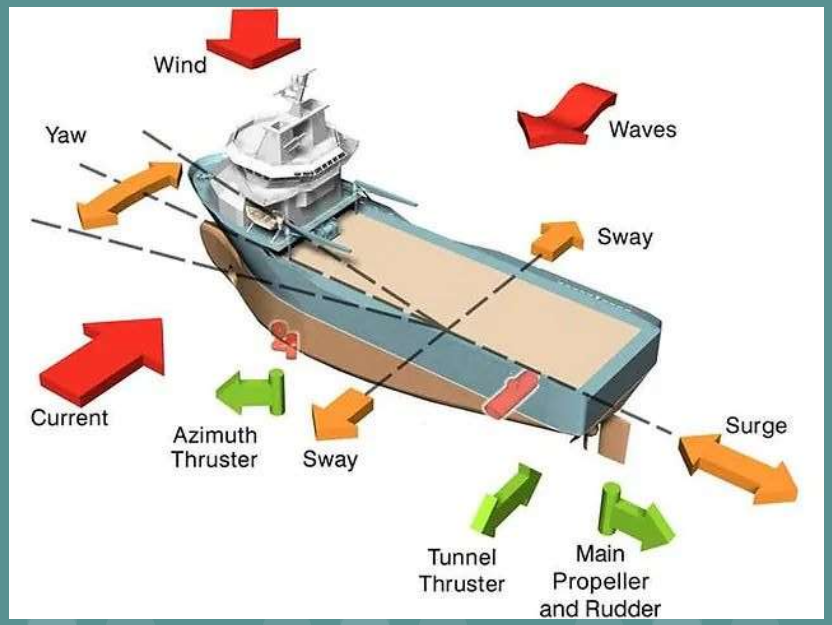
Tools Used

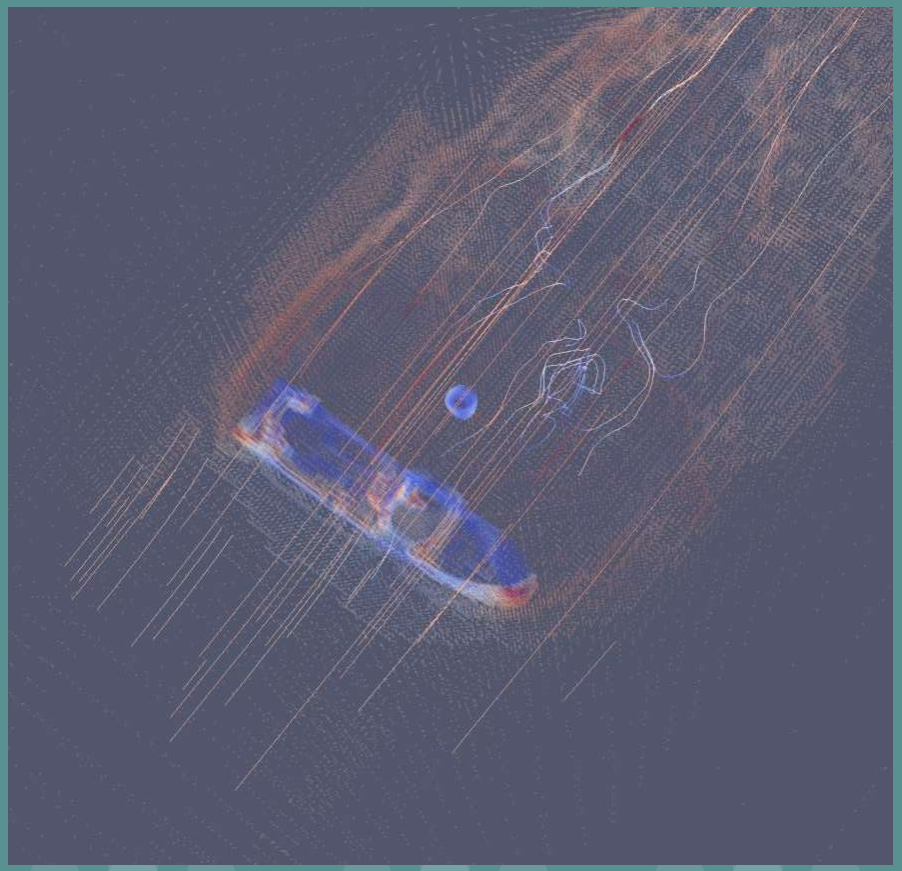
Paraview!

Solutions

Visualize flow with streamlines and vorticity

Solutions


Wind
Yaw
Waves
Sway
Current
Azimuth
Thruster
Sway
Surge
Tunnel
Thruster
Main
Propeller
and Rudder



Solutions

Visualize contour of the air flow to understand how the flow changes shape behind the ship over time

Solutions

Visualize topology and persistence of the flow to understand where the critical points of the air flow are over time

Challenges

- Renaming the files so Paraview could group timesteps appropriately
- Getting acquainted with the data
  - We originally thought the flow was underwater!
- Dealing with such a large dataset, and how slowly visualizations rendered

Expected vs. Actual Outcome

- Original plan: determine which parts of the body of the vessel are inefficient for movement
- Actual analysis: visualizing where the turbulence is greatest to support the dynamic positioning system

Questions?