Meeting

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Progress report

- Study how the simulation work in Gazebo and Xplane.

Gazebo

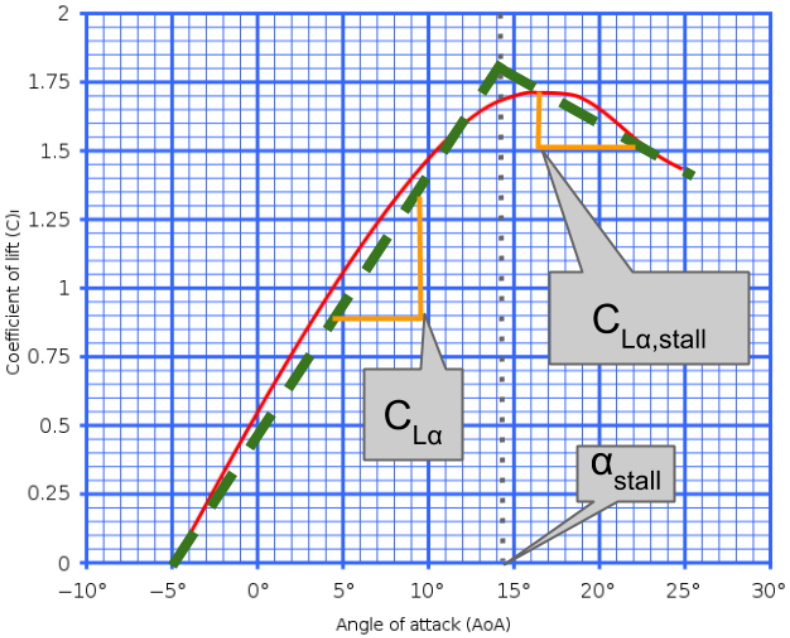

Figure 1: Simplified lift curve

```
<plugin name="lifting_surface" filename="libLiftDragPlugin.so">

  <!-- taken from the lift curve figure -->
  <!-- alpha_0 is 5 degrees -->
  <a0>0.08727</a0>
  <!-- alpha_stall is 19.3 degrees -->
  <alpha_stall>0.3368</alpha_stall>
  <!-- slope of the lift curve to the left of the stall angle -->
  <cla>5.418</cla>
  <!-- slope of the lift curve to the right of the stall angle -->
  <cla_stall>-2.1419</cla_stall>

  <!-- below are just random values in this example -->
  <cda>0.0</cda>
  <cda_stall>0.0</cda_stall>
  <cma>0.0</cma>
  <cma_stall>0.0</cma_stall>
  <area>3</area>
  <fluid_density>1.2041</fluid_density>
  <forward>-1 0 0</forward>
  <upward>0 -1 0</upward>
  <cp>0 0 1</cp>
  <link_name>lifting_surface_link</link_name>
  <radial_symmetry>false</radial_symmetry>
</plugin>
```

Figure 2: All setup of aerodynamic object

Xplane

1. Simulation method is base on blade element theory.
2. Find out the velocity vector of each element.
3. Sum up all the force, and figure out the linear and angular accelerations.

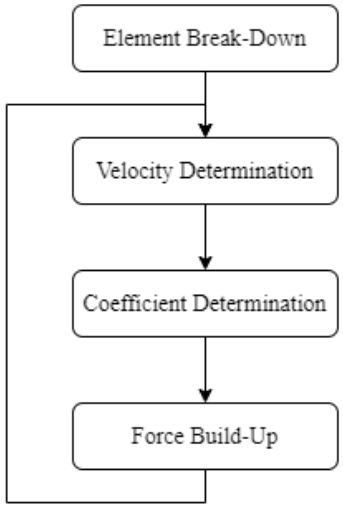

Figure 3: Flow diagram