Environment Systems

The weather of the Adriatic is itself a living, breathing thing. Blue skies one moment, rolling white clouds the next. This section will describe the weather features and how they affect flight.

# Wind

## Wind Direction

As stated, this is the direction the wind is moving.

Should be reported in 8 compass directions (N, NE, E, SE, S, SW, W, NW)

We can add some knobs to change how frequently wind direction should change, and some random deviation on the rate of change, though to start with we could just rely on debug controls to change the settings.

## Wind Magnitude

Debug visualization on-screen

## Debug controls

Maybe NumPad to change direction, + and – to increase or decrease speed.

Wind Change Rate would be good to have as a tunable variable from the start. This ensures that the wind changes direction over time when using the debug commands instead of dealing with the setting instantly changing and messing with the plane in a way that isn’t natural.

## Debug Visualization

A debug Direction and Magnitude output will help with debugging and eventually be useful for HUD implementation.

## Turbulence on the flight model

Wind should have a realistic effect of the flight model, as much as possible. This means having a somewhat accurate turbulence feeling when controlling the plane.

Depending on how fun or frustrating this is, being able to artificially override the effects of turbulence may be necessary.

# Air Masses and Jet Streams

This section describes how we might approach a more final version of Wind in a later iteration.

Doing some research on this, air masses kind of already work like “volumes” and are directed by jet streams which are “lanes” of wind that steer air masses.

For our final implementation, would look to something like this, and add splines for jet streams which can vary in wind speed somewhat randomly. We can then allow air masses to form procedurally and be   
“steered” by the jet streams.

<https://en.wikipedia.org/wiki/Air_mass>

<https://en.wikipedia.org/wiki/Jet_stream>

# Gusts

Random gusts of wind always add a little drama to flying. We should allow for random Gusts of varying speed relative to the volatility (or lack thereof) of the Air Mass.

# Far Future Systems

Some systems to keep in the back of our heads for the months ahead:

* Volatile Weather
  + Storms
  + Lightning
  + Rain
* “Arcade” Weather
  + Maybe special clouds that can act as a speed boost or height ramp
* Visualizations
  + How will we render cloud systems growing, shrinking, and moving?

# Other research (living)

<https://en.wikipedia.org/wiki/Air_navigation>

<https://en.wikipedia.org/wiki/Wind_direction>

<http://www.theweatherprediction.com/habyhints2/565/>