# Flight Simulation

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# Progress

- Merged 3D graphics code with flight physics code
- Graphics
  - Refactored and cleaned up 3D graphics code (deferred renderer)
  - Added atmospheric scattering
  - Improved algorithm for finding quadtree neighbors (Terrain)
- Physics
  - Fixed bugs with 2D flight physics

# Progress (Testing scene)

- Plane flies using 2D physics

- Infinite 3D Grid
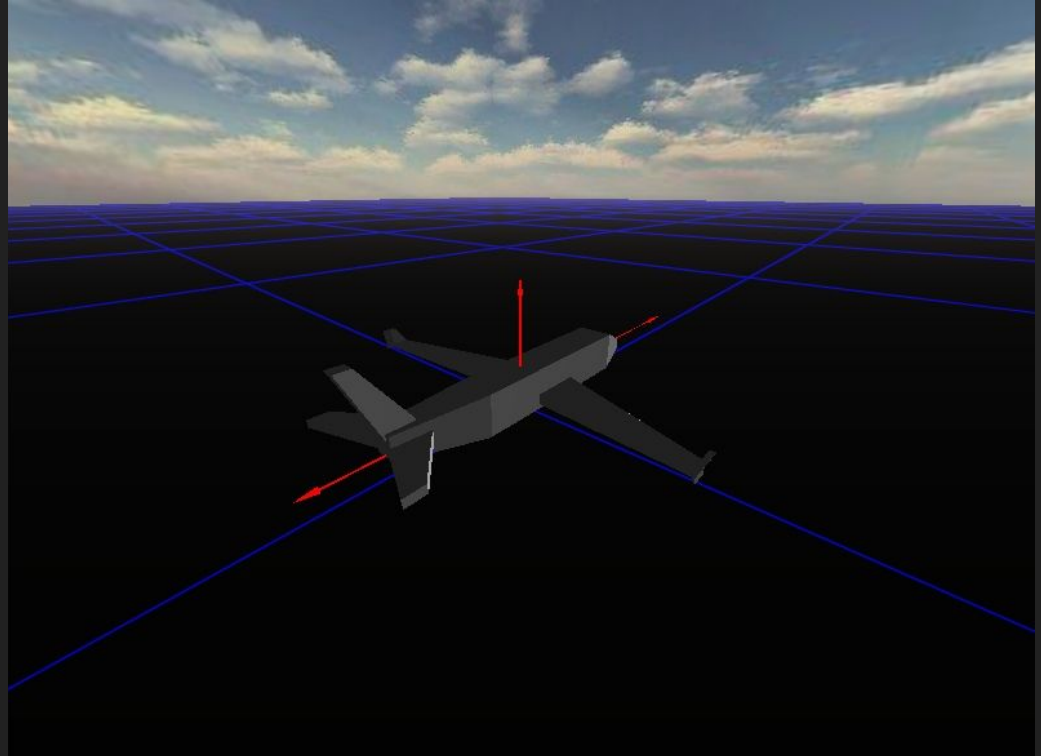
# Progress (Atmospheric scattering)

# Problems

- **Physics**
  - 3D physics seems challenging
    - Can't be split up into subtasks


- **Graphics**
  - Atmospheric scattering is not optimized
  - Graphics glitch at >100km from origin (float precision)
  - Resolution of terrain textures
    - 100 x 100 km$^2$ with 10 meters per pixel => 10000 x 10000 texture

# Schedule until the end

- Try to implement 3D physics
  - Can't divide into subtasks
  - We will probably fail multiple times before a successful attempt

- *If we have time*
  - Improve graphics
    - Render forests, grass
    - Render volumetric clouds
    - Render water
  - Optimize
    - Precompute some coefficients for atmospheric scattering
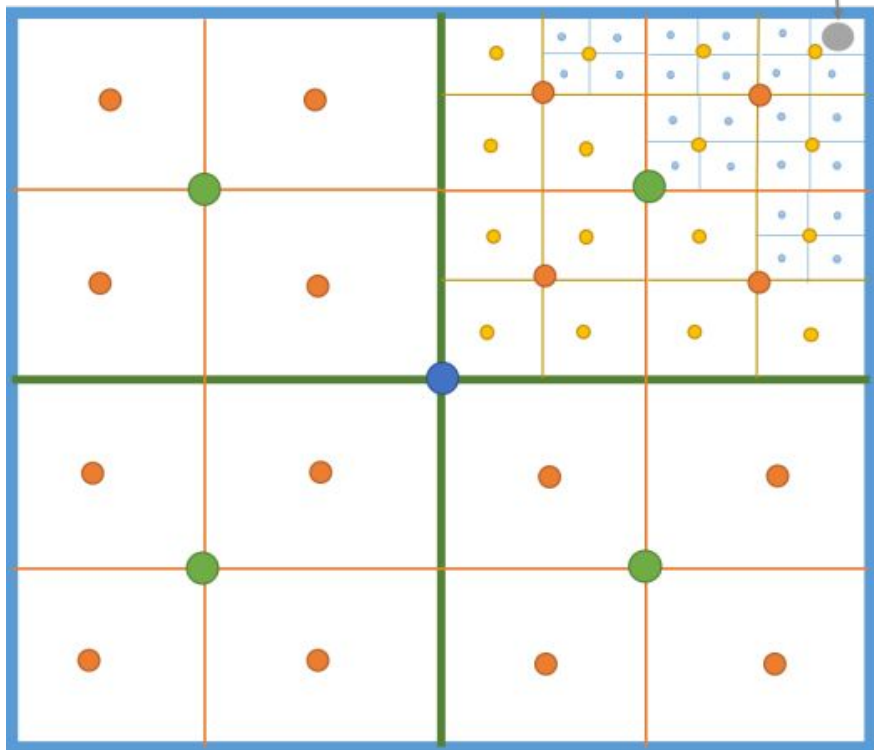
# Expected outcomes

- Worst case
  - Barebones 3D flight physics with some inaccuracies
  - Rough collision detection with terrain only
  - 3D graphics without trees, grass, water, clouds
- Best case
  - Reasonable 3D flight physics
  - More accurate collision detection that includes trees
  - Trees, grass, water, clouds

# References

Atmospheric scattering

Terrain

**Terrain (Top View)**

Camera

**Terrain Quadtree**

Root Node