# AVIATOR'S QUEST - Flight Simulator Game

## Objective

Fly an airplane through rings, avoid obstacles, shoot enemies, and survive as long as possible while collecting power-ups in an endless 3D world.

## CONTROL SCHEME

### Flight Controls:

  I - Ascend (pitch up/climb)

  K - Descend (pitch down/dive)

  J - Roll Left (bank left)

  L - Roll Right (bank right)

  Arrow Keys - Alternative precision flight controls

  U - Slide Horizontal Left (direct strafe)

  O - Slide Horizontal Right (direct strafe)

### Combat & Systems:

  F - Launch Missiles (fire at hostile aircraft)

**V - Switch View Mode (cycles through 3 camera angles)**

**ESC - Suspend/Resume Flight (pause/unpause)**

**G - Activate God Mode (unlimited shield + auto-fire)**

**N - New Mission (restart game)**

**ENTER - Begin Mission (start from title screen)**

**Mouse Controls:**

**Left Click - Launch Missiles**

**Right Click - Switch View Mode**

**CAMERA PERSPECTIVES (3 View Modes)**

**1. Tail Camera - Classic trailing view from behind and above your craft**

**2. Pilot View - First-person cockpit perspective**

**3. Wing Camera - Lateral side angle for enhanced situational awareness**

**Press V or Right Click to cycle between camera angles.**

## Game Objects

**Rings (Gold/Yellow):**

- **Fly through them to score 100 points (base)**
- **They respawn infinitely ahead of you**
- **Collecting consecutive rings builds combo multiplier (2x, 3x, 4x, etc.)**
- **Combo system: You have 3 seconds after each ring to collect the next one**

**Obstacles (3 Types):**

1. **Clouds (White) - Pass through harmlessly (non-collidable, visual only)**
2. **Rocks (Brown) - Crash into them = lose 1 life**
3. **Balloons (Red with string) - Crash into them = lose 1 life**
- **During Boost Mode: You can smash through rocks/balloons for +50 points bonus**

**Enemies (Red Aircraft):**

- **Chase and follow you using AI**
- **Shoot them for +100 points**
- **Collide 5 times = lose 1 life**
- **Collision counter resets after each life lost**
- **During Boost Mode: Ram enemies for +150 points**
- **Enemies respawn closer for better visibility (300-800 units ahead)**

**Power-ups (Cyan Spinning Cubes):**

- **Collect for +200 points + BOOST MODE activation**
- **Boost duration: 7 seconds**
- **Boost benefits:**
  - **5x speed increase**
  - **Invincibility against obstacles and enemies**
  - **Ability to smash through obstacles for bonus points**
  - **Ability to ram enemies for bonus points**
  - **Aircraft turns ORANGE during boost**

## HUD Information

**The game displays the following information on screen:**

- **Score - Total points earned**
- **Lives - Remaining lives (starts with 3)**
- **Stage/Level - Increases every 500 points**
- **Speed - Current velocity**
- **Enemy Hits Counter - Shows hits taken (0-5) before losing a life**
- **Enemies Destroyed - Total enemy kills**
- **Boost Timer - Shows remaining boost time when active**
- **Camera Mode - Current view name**
- **Combo Multiplier - Shows current combo (2x, 3x, 4x, etc.)**
- **Combo Timer - Time remaining to maintain combo chain**

**Special Features**

Start Screen:

- **Displays game title and instructions**
- **Shows all controls and objectives**
- **Press SPACEBAR to start**

Pause Menu (Press P):

- **Pauses all game action**
- **Displays current stats (score, lives, stage)**
- **Press P to resume or R to restart**

Combo System:

- **Collecting rings in sequence (moving forward) builds combo multiplier**
- **Each consecutive ring increases multiplier: 1x → 2x → 3x → 4x...**
- **Points are multiplied by combo level**
- **3-second timer to collect next ring**
- **Timer resets if you collect rings out of order or time expires**
- **Combo resets on crash**

Boost Mode Features:

- **Aircraft color changes to ORANGE when boosted**
- **Invincibility active - no damage from obstacles or enemies**
- **5x speed increase for rapid navigation**

- **Smash obstacles for bonus points**
- **Ram enemies for bonus points**
- **Visual "POWER MODE!" indicator on HUD**

**Progressive Difficulty:**

- **Speed increases as you level up (+0.5 per stage)**
- **More enemies spawn at higher stages**
- **Enemy AI becomes more aggressive**
- **Stage progression: every 500 points**

**Endless World:**

- **Infinite procedural generation**
- **Objects behind you get recycled and respawn ahead**
- **Seamless gameplay with no boundaries**
- **Continuous challenge**

**Cheat Mode (Press X):**

- **INVINCIBILITY MODE - no damage from anything**
- **Auto-firing bullets - rapid fire at enemies**
- **Magenta "INVINCIBILITY MODE!" indicator on HUD**
- **Toggle on/off anytime**

**3D Environment**

- **Ground terrain - Green grass with grid lines**
- **Sky gradient - Blue gradient from horizon to zenith**
- **Mountain scenery - Distant brown mountains on horizon**

- **Dynamic objects - Rings, obstacles, enemies, power-ups**
- **Particle effects - Explosions when destroying enemies**

**Scoring System**

| Action | Points |
|---|---|
| Ring collected | +100 points (×combo multiplier) |
| Enemy shot | +100 points |
| Enemy rammed (boost) | +150 points |
| Obstacle smashed (boost) | +50 points |
| Power-up collected | +200 points |

**Combo Multiplier Examples:**

- **Ring with 2x combo = 200 points**
- **Ring with 5x combo = 500 points**

## Game Over Conditions

**You lose when all 3 lives are depleted.**

Lives are lost by:

1. Crashing into rocks
2. Crashing into balloons
3. Taking 5 enemy collisions (counter resets after each life lost)

Note: Clouds do NOT cause damage - they're visual only.

## Additional Features

Start Screen with full instructions
Pause Menu with stats display
Combo System for consecutive ring collections
Visual Boost Mode - aircraft turns orange
Explosion Effects when destroying enemies
Animated Power-ups - rotating and pulsing
Propeller Animation on aircraft
Enemy AI - chase and evasion patterns
Infinite World Generation - seamless recycling
Multiple Camera Angles - 3 different perspectives
Progressive Difficulty scaling
Enemy Kill Counter tracking
Collision Feedback - visual explosions

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## Tips for High Scores

1. Maintain combos - Collect rings in order without missing

2. **Use boost strategically** - Save for dense obstacle sections
3. **Shoot enemies early** - Don't let them surround you
4. **Master camera views** - Switch views for better awareness
5. **Strafe (Q/E) for quick dodges without banking**
6. **Watch the collision counter** - Avoid 5th hit at all costs
7. **Collect all power-ups** - They're worth 200 points + boost

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## Technical Details

- **Engine: OpenGL with PyOpenGL**
- **Graphics: 3D polygonal rendering**
- **Physics: Custom flight dynamics**
- **AI: Enemy pursuit and evasion algorithms**
- **World: Infinite procedural generation**
- **Frame Rate: 60 FPS target**