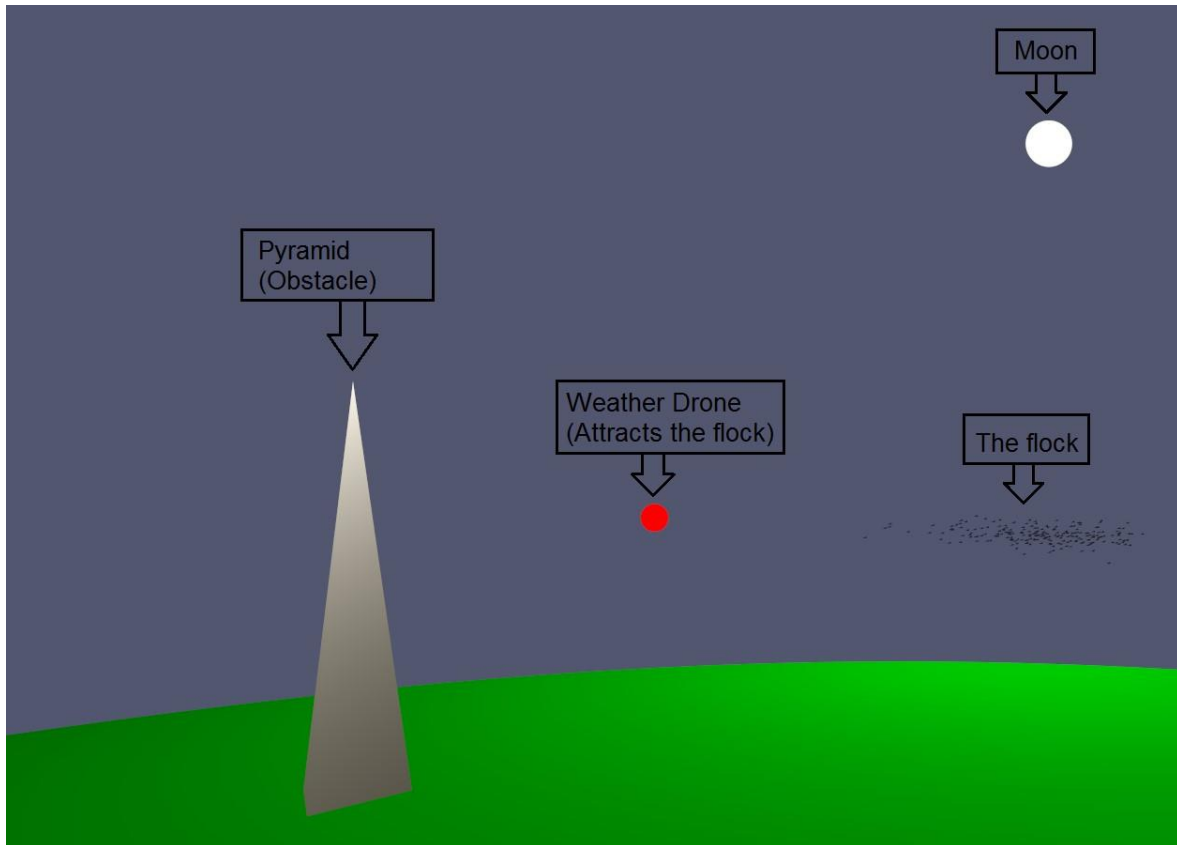# USER MANUAL

Behavioral animation based on particle systems

Fahim Hasan Khan

A flock of birds are implemented in this program based on Reynolds's model of schools, flocks, and herds.

Execution:

✦ The program can be executed using the **"./run"** executable batch file in the main directory of the project.

✦ Initial states and parameters of the simulations is read from a text data file named "parameters.txt" saved in the main directory of the project. The format used here is as follows,

File Name: parameters.txt

Line 1: size = size of rows and columns for boids. The total number of boids will be size * size. Line 2: R = Radius of the ground plane

Line 3: dt = Animation time interval/Speed factor

A lot more parameters can be passed from this file, which is not used in this implementation for simplicity.

Features and Controls:

Initially the flock is spawned in a square grid which is later changed based on the simulation. Primarily, the flock is attracted to the Red colored weather drone which travels in a circular trajectory. The flock fly around focusing the drone in different patterns. There is a single pyramid acting as an obstacle
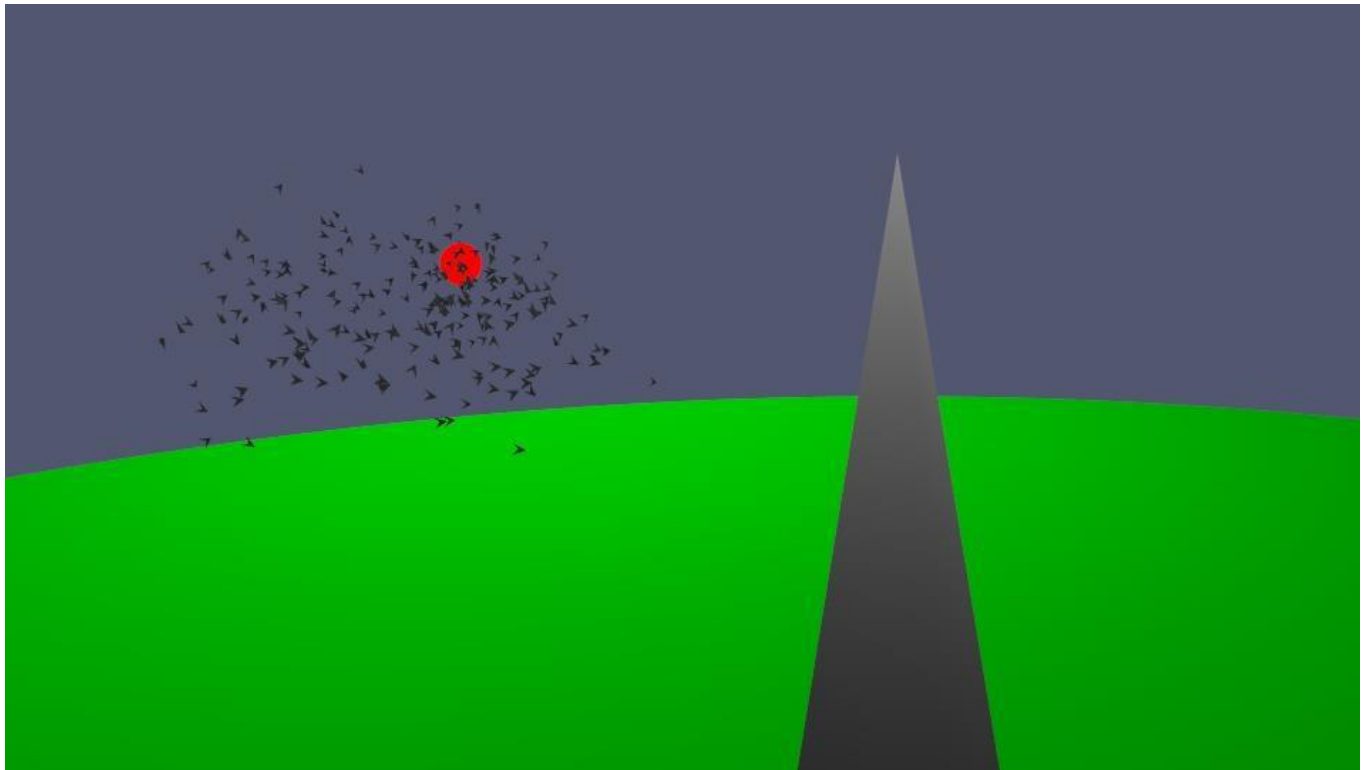
- ✦ The camera can be controlled by keep pressing **mouse button 1** and moving the mouse.
- ✦ The scene can be rotated using the keyboard **Z** and **X** keys.
- ✦ Zoom in and out can be performed using keyboard **N** and **M** keys.
- ✦ If size is set more than 30 (more than 900 boids), the flock will **split** into multiple flocks. Then, only one flock will follow the drone and others will create different effects.

A method for interactively guiding the flocks using the mouse or keyboard is also implemented in the program. The Weather Drone can be controlled manually by keep pressing the **mouse button 2 and dragging** or using the **WASD** keys of the keyboard and the flock will change their flight trajectory accordingly. The color of the Weather Drone will be changed from red to green in the manual control mode.
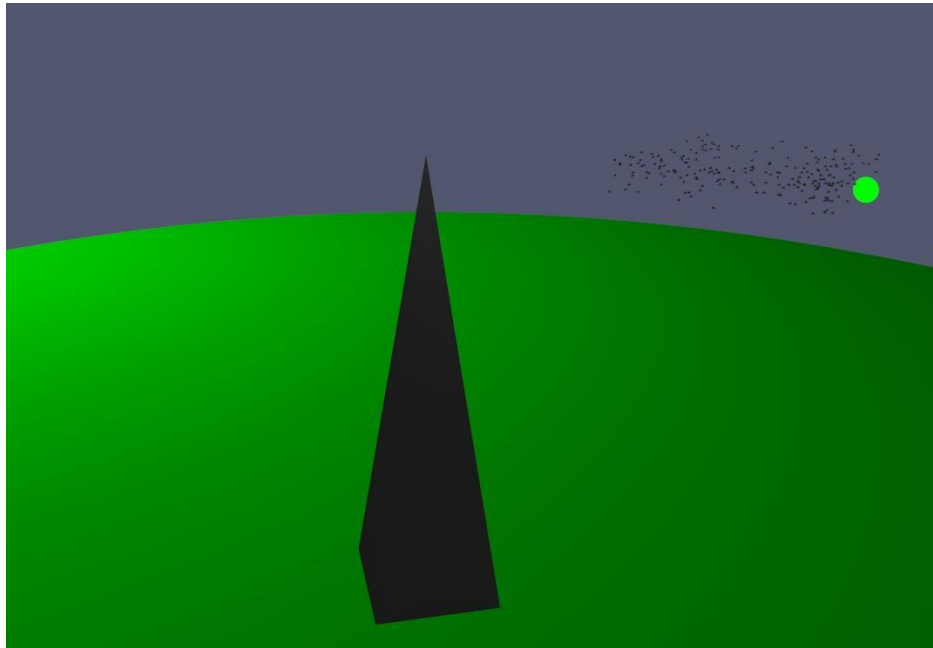
The position of the drone can be changed keeping the height constant and it can be done better by moving the camera to a top view position. Change of height of the drone is disabled as it leads the flock to go underground without the added collision detection with the ground.