Dear Mayor,

Team #7845 has designed a drone light show, including patterns of ferris wheel, dragon and firework. We recommend to implement this plan for several reasons, and this memo will illustrate each pattern. All patterns are 45 degree to the ground, because it is the best viewing angle for the audience.

First, the ferris wheel is combined with one big circle, one small circle to represent the axis and two straight lines to represent poles. The total number of drones is 225; Launch area The Launch area has 15 × 15 drones, each spacing 2 meters from others; The area is 30 × 30 = 900 ㎡; The space occupied by the show plan is 400 × 500 × 400m³; The height of the show space exceed 500 meters, which might be the flying altitude of some private planes; The duration of this plan is set to be 60 seconds. This pattern is abstract but easy to recognize, the effect of revolving ferris wheel can be showed by changing the light of each wheel, while the position of each wheel keeps the same.

In the second plan, the dragon is represented by a chain of drones traveling on a spiral, upward orbit. The total number of drones is 50; The Launch area has 5 × 10 drones, each spacing 2 meters from others; The area is 10 × 20 = 200 ㎡; The space occupied by the show plan is 130 × 160 × 100m³; The total distance each drone travels is 226.63 seconds. Although it is not directly visualized as a dragon, the image displays elegance in the movement resembling to that of a dragon.
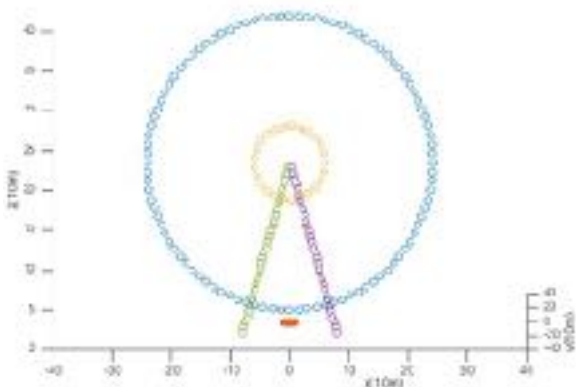


(The pattern of the ferris
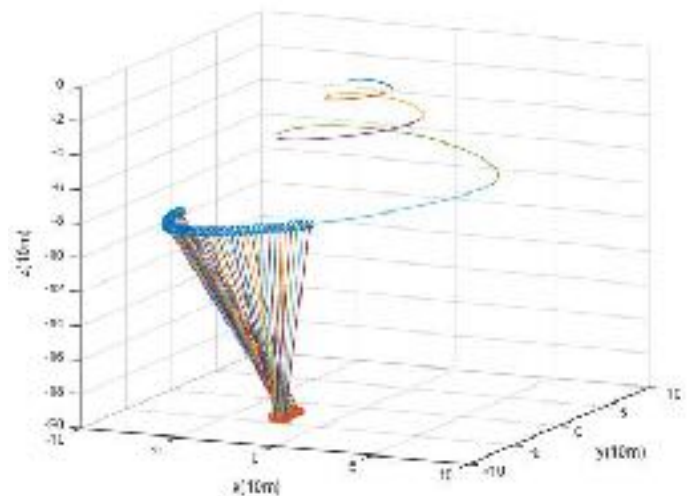


(The motion curve and initial positions of drones)

The finally plan we create on our own is a firework. It is essentially a group of drones rise up to the air and "explode" towards different directions. We also considered the gravitational effect on the firework. The total number of drones is set to be 16, and more drones could also fit in the model; The Launch area has 1 × 16 drones, each spacing 2 meters from others; The area is 1 × 32 = 32 ㎡; The space occupied by the show plan is 120 × 160 × 80m³. One special thing about this plan is that we have provided general equations, so the number of drones can be customized, creating diverse visual effects. More than one show can even be put on at a time due to the small number of drones used and the small space occupied by one show.
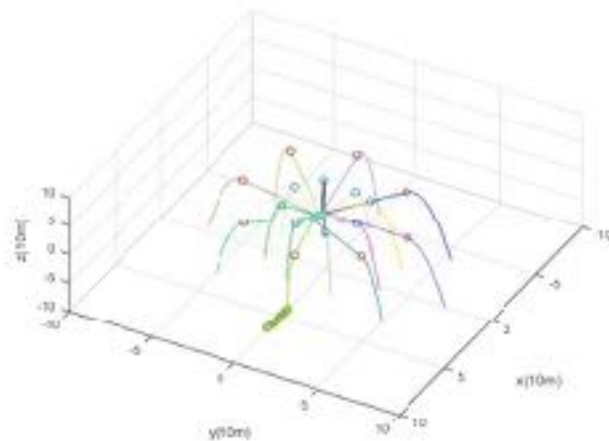


(The motion curve and initial positions of drones)

Overall, this plan is practical and entertaining. Based on our plane, the amount of drones and the size of pattern can be varied under different requirements.


yours sincerely,

Team #7845

Nov 20, 2017