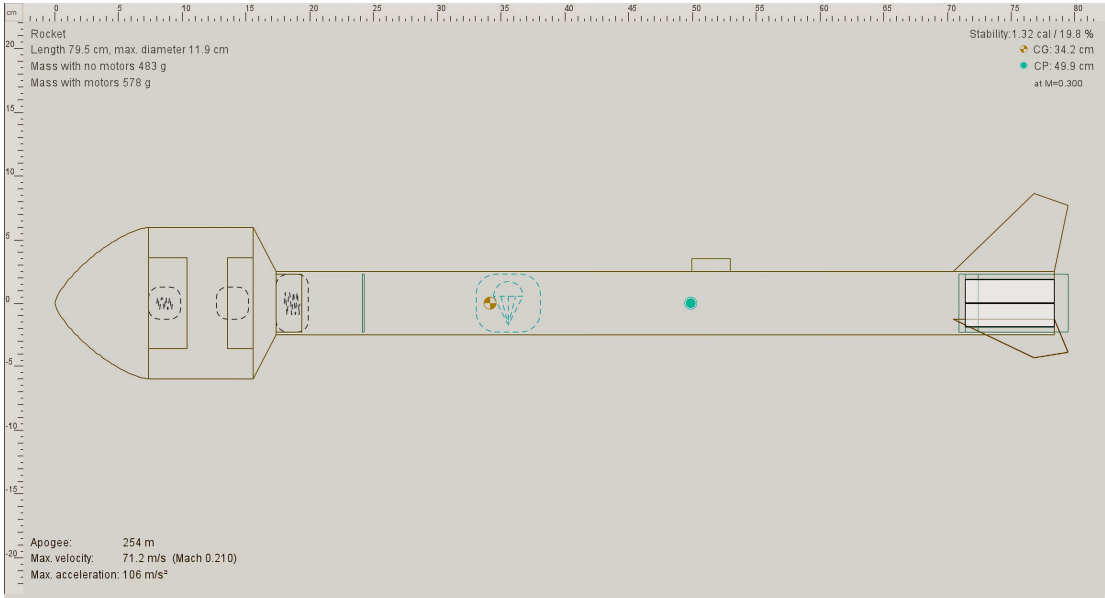
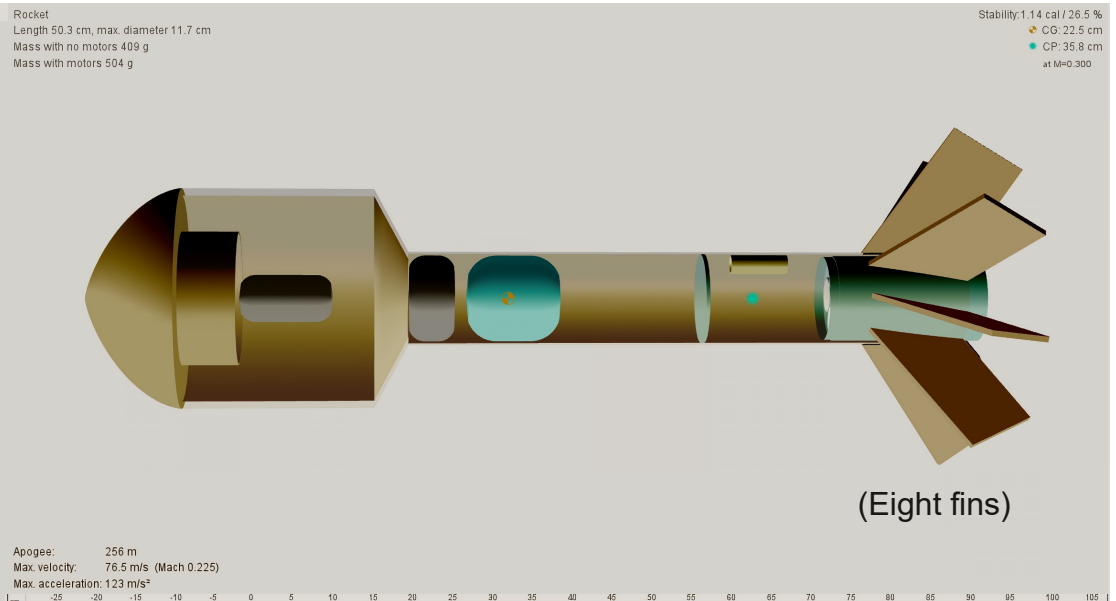
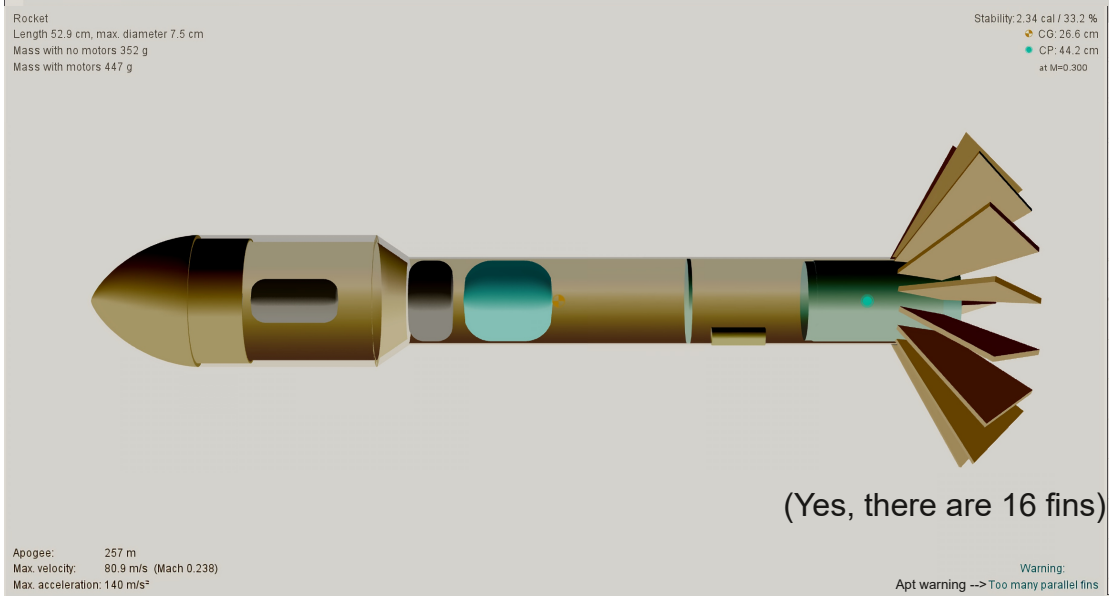
# Designs from 2021 and 2022

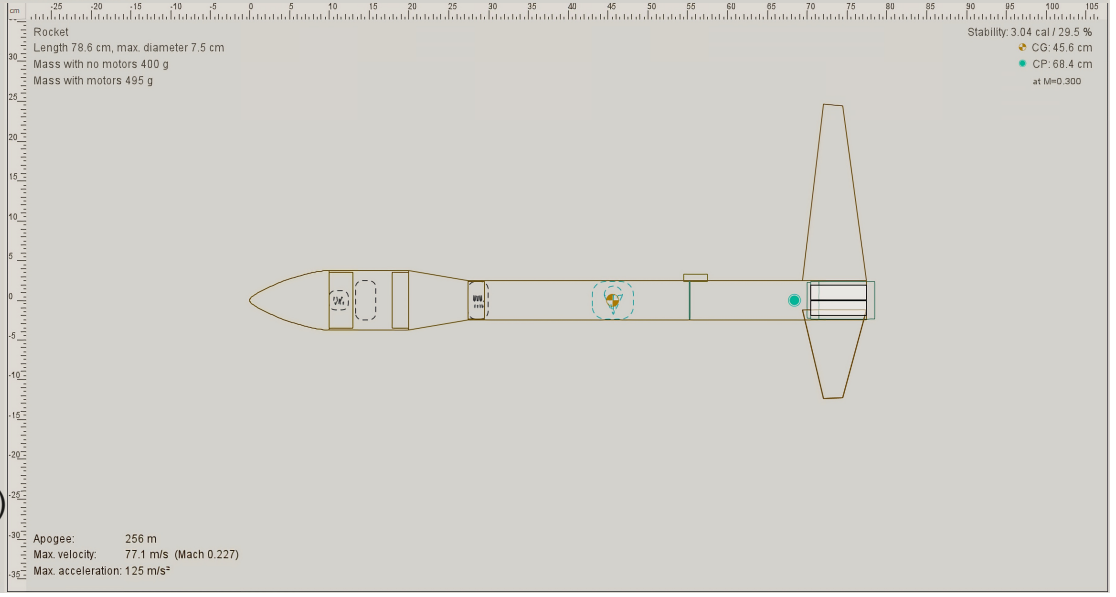


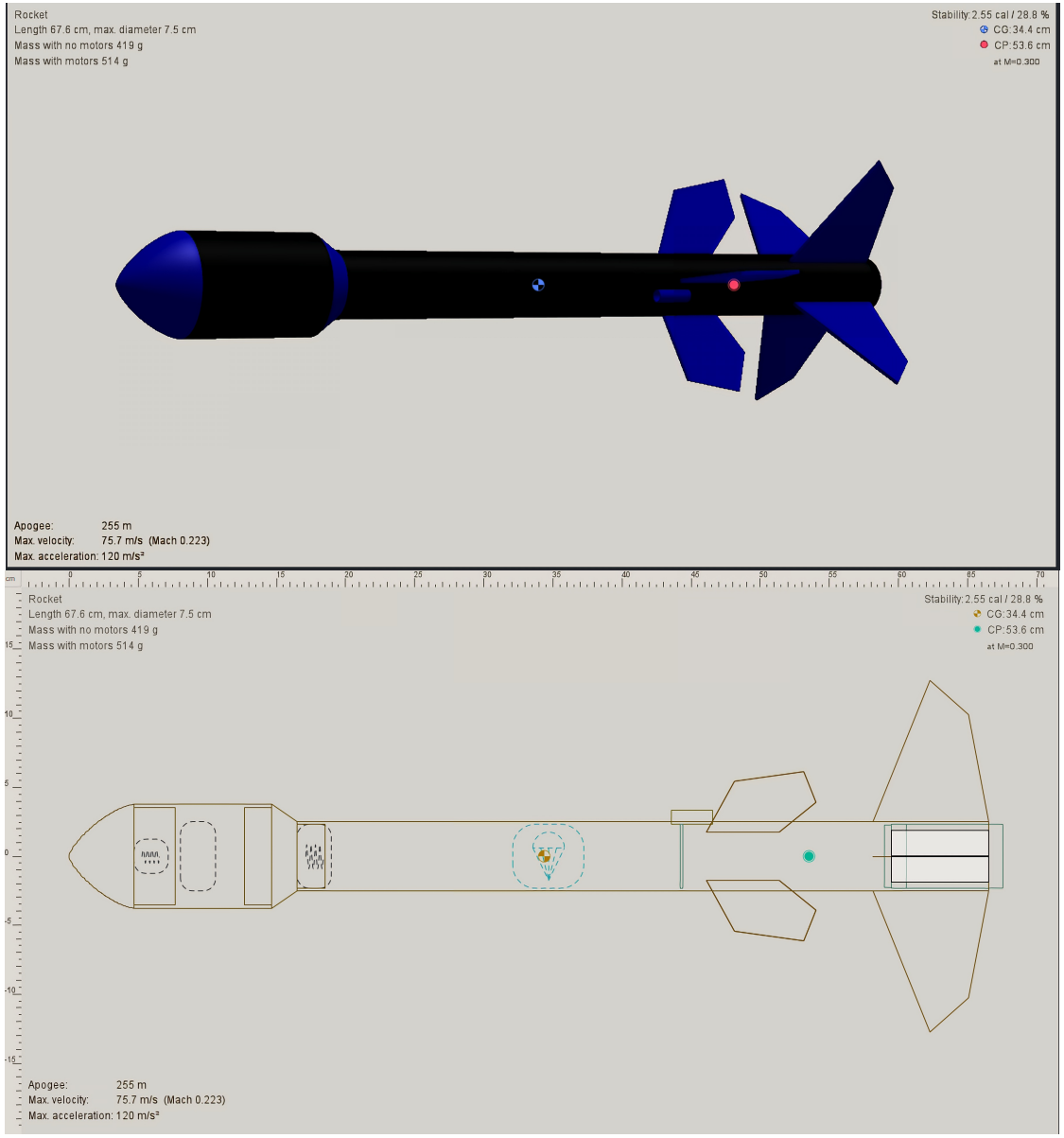




(Eight fins)



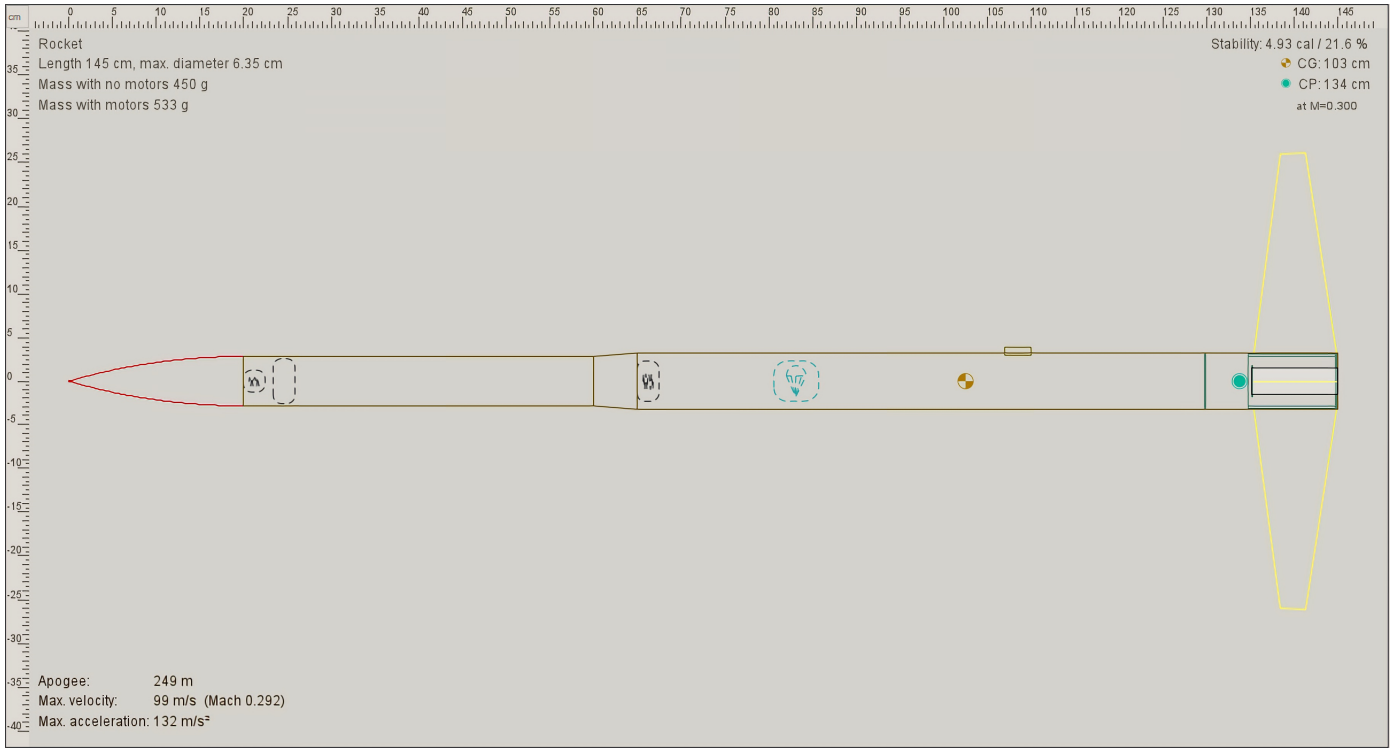

(Yes, there are 16 fins)






# Testing Unique Designs In 2021/2022

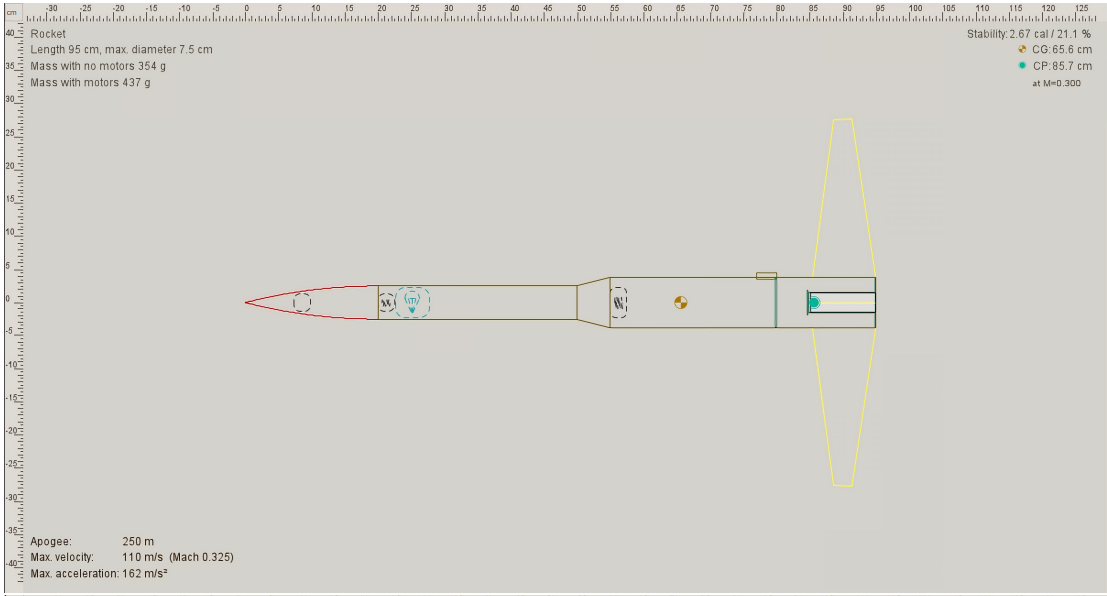
Four fins at the bottom, with an extra four smaller fins slightly above that.

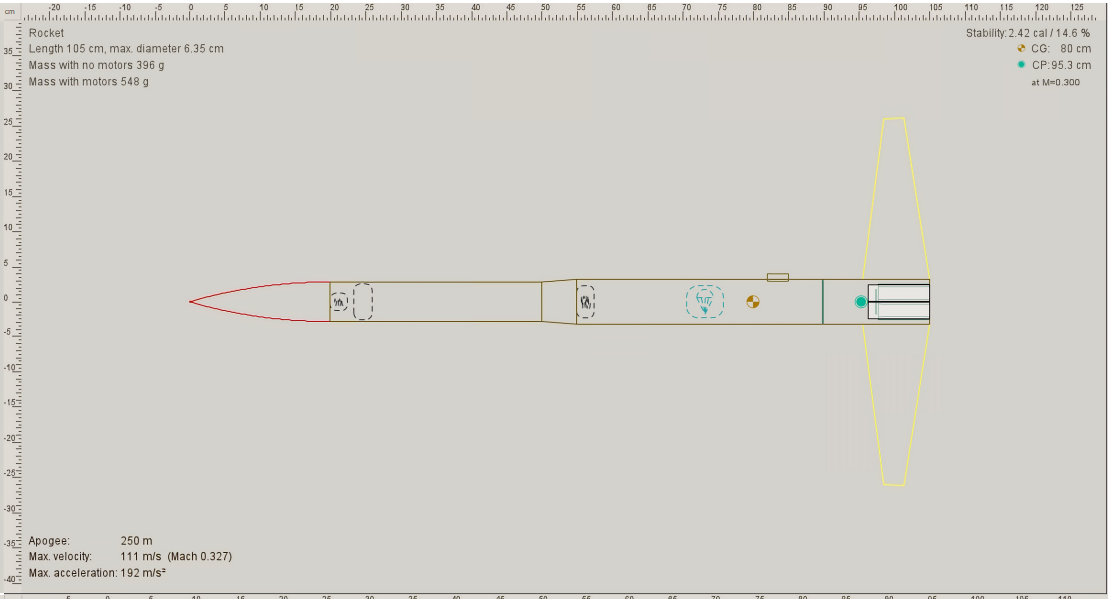


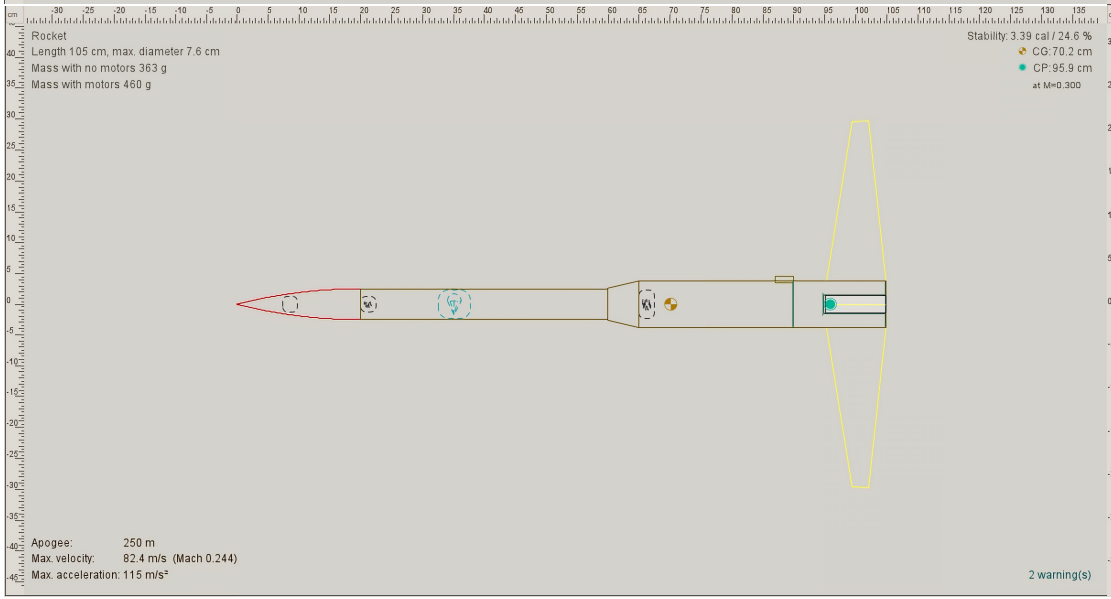

# Designs from Last Year

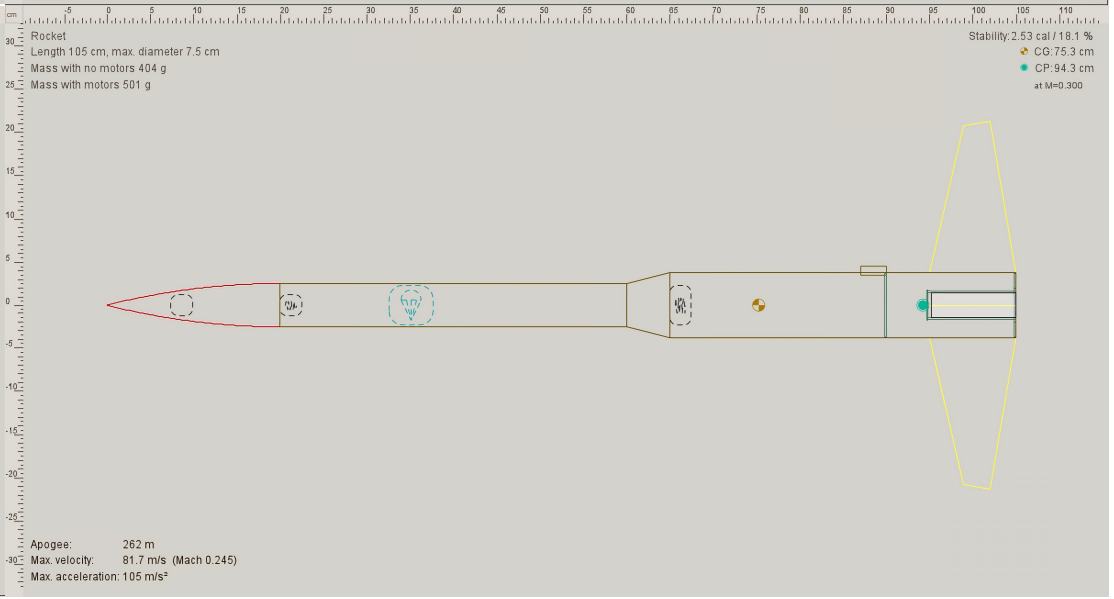
A slightly longer rocket, at over 140cm long compared to the previous ~100cm long rockets. The longer rockets tend to be much more stable than shorter ones due to the center of mass being much higher- however they also weigh much more, a "trade off" length being most optimal.

# Designs from Last Year

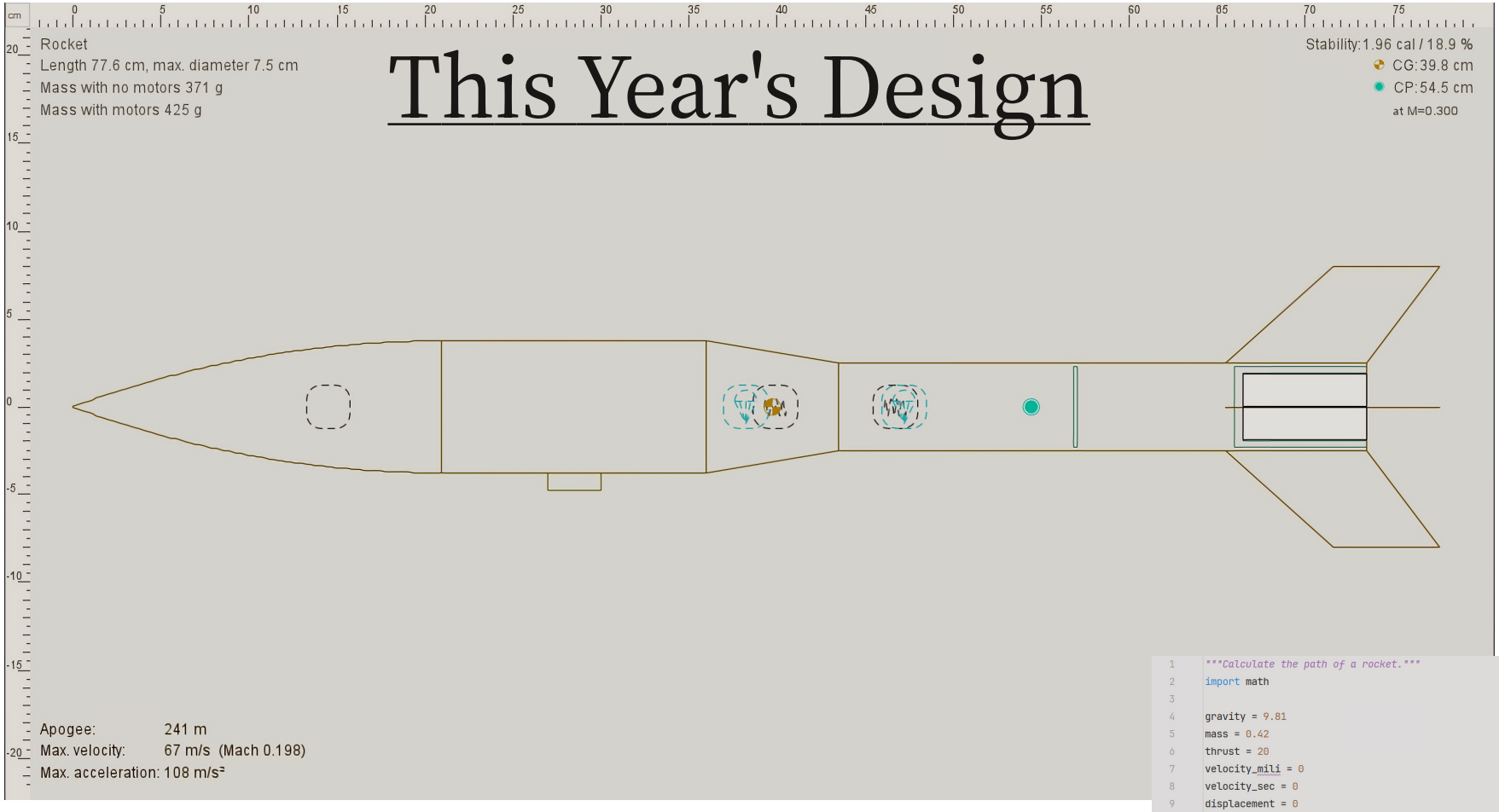


# This Year's Design



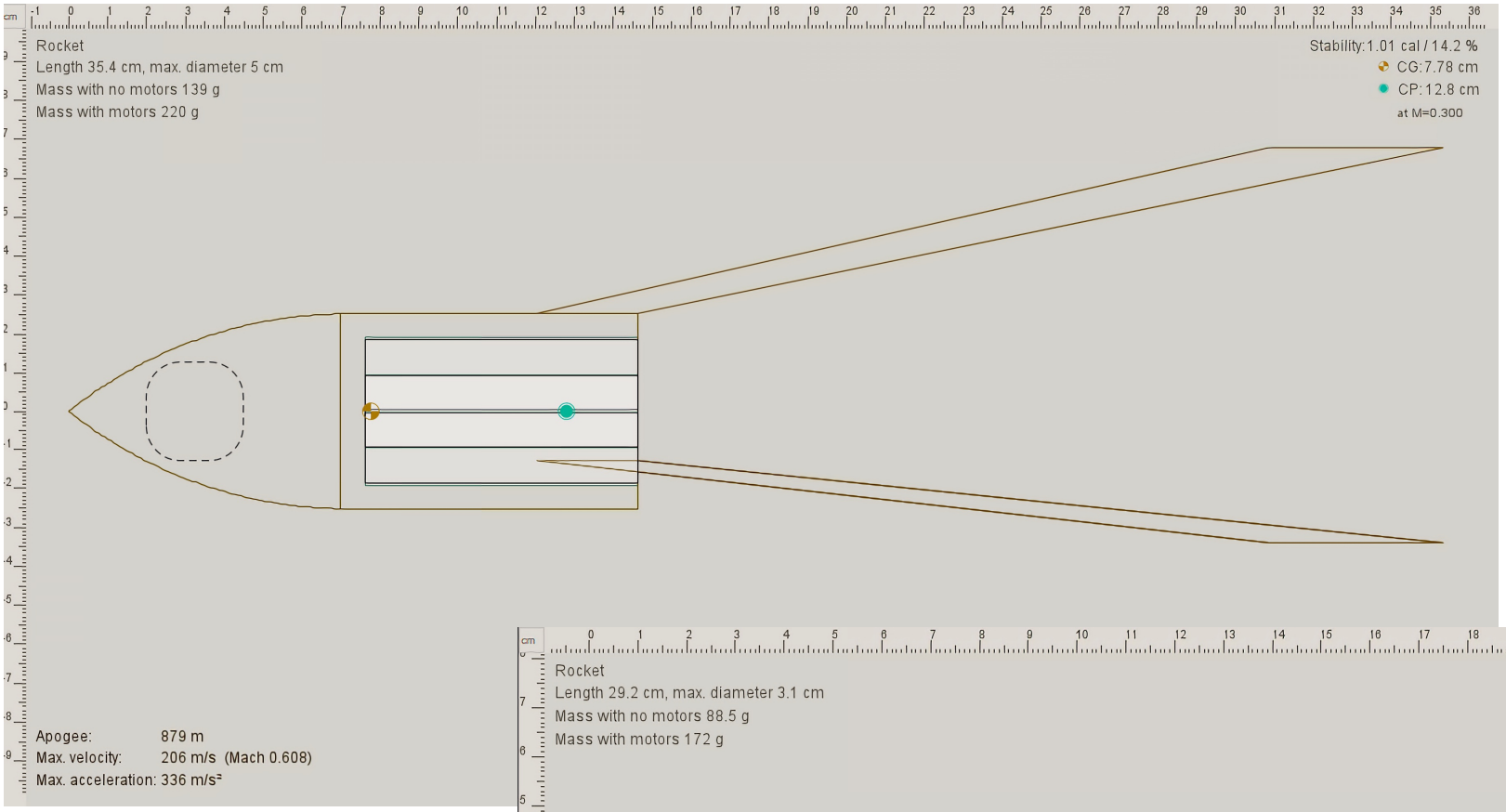

Along with some extremely rough Python coding that I did for fun.

```python
"""Calculate the path of a rocket."""
import math

gravity = 9.81
mass = 0.42
thrust = 20
velocity_mili = 0
velocity_sec = 0
displacement = 0
time = 0
period = 1000
end_time = 10
end_thrust_time = 2
angle_from_pos_y = math.radians(12)
max_displacement = displacement
max_displacement_time = 0
max_velocity = velocity_sec

while time < end_time:
    if time > end_thrust_time:
        thrust = 0
    if displacement > max_displacement:
        max_displacement = displacement
        max_displacement_time = time
    if displacement < 0:
        break
    if velocity_sec > max_velocity:
        max_velocity = velocity_sec
    air_resistance = 0.16 * 1.2 * (velocity_sec**2) * 0.5 * 0.008417
    force_mili = (thrust*(math.cos(angle_from_pos_y)) - (gravity * mass) - air_resistance) / (period ** 2)
    acceleration_mili = (force_mili / mass)
    velocity_mili += acceleration_mili
    velocity_sec = velocity_mili * 1000
    displacement += velocity_mili
    time += 1 / period

print("Reached an altitude of " + str(round(max_displacement, 2)) + " metres, " + str(round(max_displacement_time, 2))
      + " seconds after launch.   max velo= " + str(max_velocity))
```




# (Rocket designs made for fun)