ENAE 483/788D LECTURE #05
(SPACE ENVIRONMENT) PROBLEMS – FALL, 2024

(1) Starship can be (crudely) approximated by a cylinder 9 m in diameter and 50 m long. At an orbital altitude of 200 km, what is the drag force on Starship if the long axis is perpendicular to the velocity vector?

(2) In the same conditions, what is the drag force if Starship's cylindrical axis is aligned with the velocity vector?

(3) After International Space Station is deorbited in 2030, it will be necessary to develop a replacement. People have suggested that a single Starship would have a greater pressurized volume than ISS and could be outfitted to serve as a long-term space station without requiring assembly. If it stayed in a 500 km orbit for 10 years, what is the largest MMOD particle would you have to design for (on average)?

(4) Over that same time, how many hits would you expect to have from particles with a diameter of 0.2 mm?